

# **A Report Workshop on Applied Mathematics and Physics: Bridging Theory and Practice for Future Innovators**

**RESEARCH AND DEVELOPMENT CELL**



**SURANA COLLEGE  
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Affiliated to Bangalore University | Re-accredited by NAAC with A+  
Recognised under section 2(f) & 12(B) of UGC

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## **RESEARCH AND DEVELOPMENT CELL**

In Association with

on

**Karnataka Science and Technology Academy (KSTA)**

**Department of Science and Technology, Government of Karnataka**

**ORGANIZED**

**A TWO-DAY WORKSHOP**

**APPLIED MATHEMATICS AND PHYSICS:**

**BRIDGING THEORY AND PRACTICE FOR FUTURE INNOVATORS**

**Date: January 9th & 10th, 2025**

**Venue: Seminar Hall, Surana College Autonomous, South End Road,  
Bangalore -04.**



## Preamble:

The Research and Development Cell of Surana Educational Institutions, in collaboration with the Karnataka Science and Technology Academy (KSTA) and the Department of Science and Technology, Government of Karnataka, organized a two-day workshop titled *"Applied Mathematics and Physics: Bridging Theory and Practice for Future Innovators"* on January 9th and 10th, 2025. This workshop aimed to provide a platform for academicians, researchers, and students to gain insights into the practical applications of mathematical and physical principles in innovation and technology development.

The event featured prominent resource persons from esteemed institutions like IISc Bangalore, CHRIST (Deemed-to-be University), PES University, and Alliance University. It included four technical sessions addressing key topics such as computational mathematics, statistical methods, quantum physics, and advanced quantum mechanics. The workshop was designed to foster interdisciplinary learning and bridge the gap between theoretical knowledge and practical innovation, empowering participants to contribute to the fields of science and technology.

The poster features a central image of a man in a suit holding a tablet, surrounded by mathematical and scientific symbols like  $E=mc^2$ ,  $a^2+b^2=c^2$ , and  $e^{i\pi}=-1$ . The text on the poster includes:

- RESEARCH AND DEVELOPMENT CELL**
- In Association with**
- Karnataka Science and Technology Academy (KSTA)**
- Department of Science and Technology, Government of Karnataka**
- ORGANIZES**
- A TWO DAY WORKSHOP**
- on**
- APPLIED MATHEMATICS AND PHYSICS:**
- BRIDGING THEORY AND PRACTICE FOR FUTURE INNOVATORS**
- Date: January 9<sup>th</sup> & 10<sup>th</sup>, 2025**
- Venue: Seminar Hall, Surana College Autonomous, South End Road, Bangalore -04.**



## **Day 1: January 9th, 2025**

The day began with the registration of participants at 8:00 AM. Registered participants received their conference kits and essential information, coordinated by Mr. Sumukha and Dr. Pooja. The arrival and hospitality of resource persons were meticulously managed by Dr. Vanishree and Dr. Divya Dexlin.

### **Inaugural Ceremony**

The inaugural session commenced at 9:30 AM with Dr. Seethalakshmi served as the Master of Ceremonies. The ceremony began with the lighting of the lamp and an invocation song by Ms Anagha, BSc Student, Surana College Autonomous, followed by a video tribute of Surana Educational Institutions.

Dr. Vanishree M.R., Dean of the Research and Development Cell, delivered the welcome address, setting an inspiring tone for the workshop. She emphasized the pivotal role of mathematics and physics in fostering innovation and highlighted the workshop's objective of bridging theory with practice to equip participants with cutting-edge knowledge and skills. Her words resonated with the participants, instilling enthusiasm and anticipation for the sessions ahead.

Dr. Veena K.N., Principal of Surana College Autonomous, delivered the inaugural address, focusing on the importance of interdisciplinary learning in mathematics and physics. She stressed how these disciplines drive technological advancements and encouraged participants to leverage their knowledge to address real-world challenges. Her insightful remarks underlined the workshop's relevance in today's academic and professional landscape.

Following this, Dr. Seethalakshmi provided a concise program overview, detailing the themes and objectives of the technical sessions. The inaugural ceremony concluded with a heartfelt vote of thanks by Dr. Sompalli Bhavana, who expressed gratitude to the dignitaries, participants, and organizers. A group photo session at 10:00 AM marked the ceremonial closure, capturing the momentous start of the two-day workshop.

The event was generously funded by KSTA and brought together 80 participants from diverse institutions across India, representing a wide spectrum of academic disciplines. Notably, one participant traveled from Jammu, underscoring the nationwide appeal of the workshop. Institutions like Nrupathunga University, CHRIST (Deemed to be University), National College, MES College of Arts, Science, and Commerce, and Maharani Cluster University were among the prominent contributors. The workshop served as an interdisciplinary nexus for knowledge exchange and skill enhancement, fostering innovative thought and application-driven learning.



### Day 1- Technical Session

The first technical session of the workshop began promptly at 10:05 AM with Dr. Divya Dexlin introducing the resource person, **Dr. Arulalan Rajan**, a faculty member from the Indian Institute of Science (IISc) Bangalore. Dr. Rajan, a leading expert in applied mathematics, began his lecture on Mathematical Foundations in Applied Sciences by discussing the critical role that mathematical principles play in solving real-world scientific problems. He emphasized the importance of a solid mathematical foundation for understanding complex phenomena in fields



ranging from engineering and physics to data science and economics. By using relatable examples and visual aids, Dr. Rajan made the content accessible to a diverse audience, engaging both students and faculty in the intricacies of mathematical theory.

Dr. Rajan's lecture covered the fundamental mathematical tools used in various scientific domains, such as differential equations, linear algebra, and calculus. He explained how these tools are essential for modeling and analyzing systems in engineering, fluid dynamics, and natural sciences. The participants gained valuable insights into the importance of mathematics as a language that helps describe and predict real-world occurrences. The session highlighted how applied mathematics helps bridge theoretical concepts with practical solutions. Dr. Rajan also discussed several landmark problems and solutions in the history of applied mathematics, demonstrating how mathematical innovation drives scientific progress.

After the lecture, a vibrant Q&A session followed, where participants had the opportunity to engage directly with Dr. Rajan. The questions ranged from inquiries about specific mathematical models to more general discussions on how mathematical techniques are applied in emerging technologies. Dr. Rajan took the time to clarify complex topics, ensuring that everyone, regardless of their level of expertise, could gain something from the session. This interaction showcased the enthusiasm and curiosity of the participants, and the session ended with a short tea break, allowing attendees to reflect on the concepts discussed.

The session resumed at 11:30 AM with Dr. Rajan's second talk, titled Computational Mathematics and Simulation. In this segment, Dr. Rajan shifted focus to the computational techniques that are indispensable in modern science and technology. He explored how advanced algorithms, coupled with high-performance computing, enable researchers to simulate and solve problems that are otherwise analytically intractable. Using real-world examples, Dr. Rajan demonstrated how simulations are used in various fields, from predicting weather patterns and modeling fluid dynamics to simulating molecular behavior in drug design.

One of the key takeaways from this talk was the importance of computational tools in understanding and visualizing complex systems. Dr. Rajan explained how mathematical models are translated into computational algorithms, which then run simulations to test

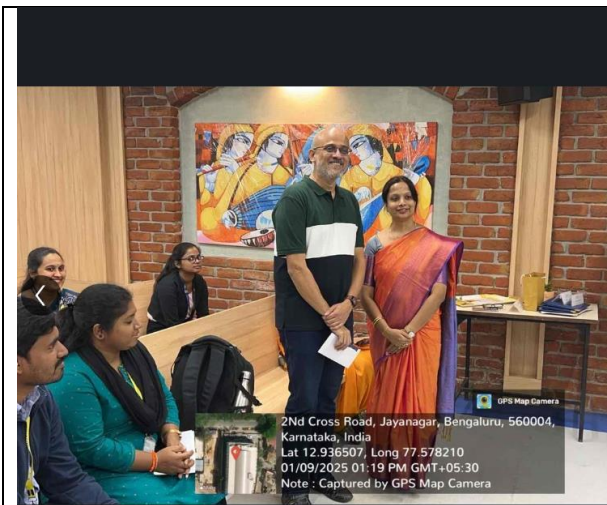


hypotheses and predict outcomes. He elaborated on the computational frameworks used in physics, particularly in simulating quantum systems and particle interactions, and how these techniques are used in both theoretical and applied physics. This section of the talk provided the participants with a deeper understanding of the synergy between mathematics, computation, and practical applications in scientific research.

Dr. Rajan also shared insights into the future of computational mathematics, emphasizing the growing role of machine learning and artificial intelligence in simulating and solving mathematical models. As the demand for real-time simulations and predictive modeling increases, the ability to leverage computational power and advanced algorithms will become increasingly vital in various sectors, including healthcare, finance, and environmental science. He also touched upon the interdisciplinary nature of computational mathematics, stressing how collaborations between mathematicians, computer scientists, and engineers lead to innovative solutions in diverse domains.

The session concluded with another interactive Q&A segment. Participants asked insightful questions about the use of computational techniques in different scientific areas, from computational biology to artificial intelligence. Dr. Rajan responded to each query with detailed explanations, highlighting the practical aspects of the methods discussed. His thorough responses ensured that the participants left with a clear understanding of the significance of computational mathematics in contemporary research.

Following the Q&A, Dr. Bhavana delivered a vote of thanks, expressing her gratitude to Dr. Rajan for his engaging and informative session. She acknowledged the immense value his insights brought to the workshop and the participants' learning experience. The session ended with a photo session, capturing the moment before the participants proceeded to the next part of the program.



## Technical Session 2: Applied Mathematics

The second technical session began at 2:00 PM with Dr. Sumaiya Tabassum introducing the resource person, **Dr. Sudev N V**, Professor at the School of Science, CHRIST (Deemed to be University). Dr. Sumaiya provided an overview of Dr. Sudev's academic credentials and



contributions to the fields of data science and engineering. Following the introduction, Dr. Sudev took the stage to deliver his first lecture on **Statistical Methods in Data Science and Engineering**, a topic that is crucial for analyzing complex data sets in both academic research and industry applications. Dr. Sudev began by discussing the fundamental principles of statistics and its role in data science, explaining how statistical methods are essential for making sense of large, often noisy, data sets encountered in real-world scenarios.

Dr. Sudev then delved into various statistical techniques that are commonly used in data science and engineering, such as regression analysis, hypothesis testing, and Bayesian inference. He emphasized the importance of selecting the right statistical method depending on the nature of the data and the specific objectives of the analysis. By using practical examples, Dr. Sudev illustrated how statistical methods can help identify patterns, trends, and relationships within data, thereby enabling informed decision-making. His talk also highlighted the growing role of statistical analysis in machine learning algorithms, as data-driven models increasingly rely on statistical methods to improve their accuracy and robustness.

The session also covered the significance of advanced statistical techniques in engineering fields, where they are applied to optimize designs, improve system performance, and predict outcomes. Dr. Sudev shared insights on how statistical methods are used in fields such as signal processing, quality control, and operations research. The participants were particularly engaged by the real-world applications he showcased, which demonstrated the practical value of statistical methods in improving technological and industrial processes. The lecture not only deepened the participants' understanding of statistics but also provided them with tools they can apply in their own research or professional work.

Following Dr. Sudev's lecture, a lively Q&A session took place from 3:15 PM to 3:20 PM. During the session, participants posed questions related to statistical challenges they face in their own work, such as the difficulties of working with incomplete or biased data. Dr. Sudev provided thoughtful responses, offering guidance on how to overcome common statistical pitfalls and reinforcing the importance of critical thinking when applying statistical methods. The Q&A allowed for valuable interactions, with participants gaining a clearer understanding of how to apply the concepts discussed during the lecture in practical scenarios.



The Q&A session was followed by a short high tea break, giving the participants an opportunity to network and discuss the lecture informally. The break also served as a brief respite, allowing everyone to reflect on the statistical methods that had been covered and engage in further conversations about their relevance to various scientific and engineering domains. As the break concluded, participants returned to their seats for the next session.

At 3:30 PM, the session resumed with Dr. Sudev's second lecture on **Optimization and Game Theory Applications**, a topic that explored mathematical techniques used to optimize decision-making in competitive and cooperative scenarios. Dr. Sudev introduced the fundamentals of optimization theory, discussing techniques such as linear programming and integer programming, which are vital for solving real-world optimization problems. He also covered the applications of game theory in economics, engineering, and computer science, explaining how game-theoretic models help understand strategic interactions in competitive environments. Dr. Sudev illustrated these concepts through examples from various industries, including logistics, finance, and even biology, showing the versatility of optimization and game theory in solving complex, real-world problems.

The session concluded with another Q&A segment from 4:45 PM to 4:50 PM. Dr. Sudev addressed questions related to the practical challenges of applying optimization and game theory in different contexts. He also provided additional insights into how these mathematical techniques can be integrated into emerging technologies like artificial intelligence and machine learning. Dr. Sudev's thorough explanations and practical examples left the participants with a deeper understanding of how optimization and game theory can be applied to solve pressing issues in both academia and industry.

The day's technical sessions ended with a vote of thanks delivered by Dr. Sompalli Bhavana, who expressed her gratitude to Dr. Sudev for his enriching contributions to the workshop. Dr. Bhavana also thanked the participants for their active engagement and participation throughout the session. The formal proceedings concluded with a group photo session at 4:55 PM, providing a memorable moment for all involved before participants headed off to their next activity.



## Day 2- Technical Session

The second day of the workshop began at 9:55 AM with Dr. Seethalaxmi welcoming the resource person, participants, and distinguished guests. She set the stage for the day's sessions, emphasizing the significance of interdisciplinary knowledge in advancing both physics and applied sciences. Dr. Seethalaxmi's warm welcome created an enthusiastic atmosphere as the participants settled in for the session.

At 10:00 AM, Dr. Farzan Tasneem M I introduced the resource person, **Dr. Gajanan Honnavar**, a Professor and Team Leader at QuaNaD Lab, PES University. Dr. Farzan highlighted Dr. Gajanan's vast expertise in the fields of data science, machine learning, quantum physics, and electronics, making him an ideal speaker for the day's technical discussions. Dr. Gajanan's credentials and his leadership in the field set the tone for the insightful sessions that followed.

The first session, starting at 10:05 AM, focused on Data Science and Machine Learning Fundamentals. Dr. Gajanan, as the session chair, delivered an engaging talk on the core



concepts of data science and machine learning, underscoring their growing importance in various scientific and industrial domains. He provided an overview of key concepts, including supervised and unsupervised learning, data preprocessing, and model selection. The session highlighted the role of data science in extracting actionable insights from complex data sets, driving innovations across fields ranging from healthcare to economics. Dr. Gajanan also discussed machine learning algorithms such as decision trees, support vector machines, and neural networks, explaining their applications in real-world scenarios.

The participants were actively engaged, with Dr. Gajanan offering practical insights into how machine learning is being applied to solve real-world problems. He demonstrated the power of machine learning in automation, predictive analytics, and decision-making processes, stressing its transformative impact on industries such as healthcare, automotive, and finance. The session provided participants with a solid foundation in data science and machine learning, sparking interest in further exploring these cutting-edge technologies. At the end of the talk, Dr. Gajanan encouraged the audience to continue building their knowledge in these fields, as they are essential for shaping the future of scientific research and technological advancements.

After the lecture, a Q&A session was held from 11:15 AM to 11:20 AM, allowing participants to ask questions and clarify doubts related to data science and machine learning. The interaction was fruitful, with participants seeking guidance on how to get started with machine learning projects and how to handle various types of data in practical scenarios. Dr. Gajanan provided clear, actionable advice, further enriching the participants' understanding of the concepts covered in the session.

Following the Q&A session, a high tea break from 11:20 AM to 11:30 AM allowed the attendees to mingle and discuss the lecture informally. The break provided a refreshing opportunity for networking and exchanging ideas, as participants reflected on the insights gained from the morning session.

At 11:30 AM, the session resumed with Dr. Gajanan's next lecture on Quantum Physics and Electronics in Innovation, which explored the intersection of quantum mechanics and electronics in driving innovation. Dr. Gajanan began by explaining the fundamental principles of



quantum physics, including quantum superposition and entanglement, and how these principles are being leveraged in the development of next-generation electronic devices. He provided insights into quantum computing, quantum sensors, and the role of quantum mechanics in revolutionizing electronics. Dr. Gajanan emphasized how these innovations are poised to solve problems that classical technologies are unable to address.

The session on quantum physics was engaging, as Dr. Gajanan illustrated the real-world applications of quantum electronics in areas such as cryptography, communication systems, and advanced computing. He also discussed the challenges involved in harnessing quantum technologies and the ongoing research aimed at making quantum devices more practical and scalable. The lecture captivated the participants, highlighting the profound impact quantum physics and electronics will have on future technological advancements.

Following the session, a Q&A segment from 1:00 PM to 1:05 PM provided the participants with the opportunity to seek clarification on quantum mechanics and its applications in electronics. The questions reflected the participants' deep interest in the topic, with several attendees asking about the feasibility of quantum computers and their potential impact on industries like cybersecurity and AI.

At 1:05 PM, Dr. Sompalli Bhavana delivered the vote of thanks, expressing gratitude to Dr. Gajanan for his insightful lectures and to the participants for their active participation. She also acknowledged the efforts of the organizing team and sponsors for making the workshop a success. The formal proceedings concluded with a photo session from 1:10 PM to 1:15 PM, capturing the memories of the workshop.

Finally, the lunch break followed from 1:15 PM to 2:00 PM, offering participants a chance to relax, network further, and reflect on the valuable knowledge they had gained throughout the day's sessions.



The final session of the workshop commenced at 2:00 PM with an introduction to the resource person, Dr. Pooja R, who introduced **Dr. Srikanth Itapu**, International Affairs, Faculty of Engineering and Technology, Alliance University as the speaker for the afternoon session. Dr. Srikanth, with his expertise in applied physics and data science, was poised to share valuable insights in the session. His background in international affairs, specifically in engineering and



technology, was highlighted, ensuring the participants understood the depth of knowledge Dr. Srikanth would bring to the session.

At 2:05 PM, Dr. Srikanth began the first talk of the session on **Statistical Methods in Data Science and Engineering**. As the session chair, Dr. Srikanth initiated the discussion by emphasizing the importance of statistical methods in the fields of data science and engineering. He outlined how these methods are crucial in interpreting large datasets and solving real-world problems across various domains, including engineering, health sciences, and social sciences. Dr. Srikanth discussed key statistical techniques, such as regression analysis, probability distributions, and hypothesis testing, explaining their applications in analyzing experimental data and engineering systems.

Throughout the lecture, Dr. Srikanth engaged the participants with examples of how statistical methods are applied in diverse engineering problems. He discussed case studies where data-driven insights played a pivotal role in optimizing engineering processes, enhancing quality control, and predicting system behavior. His clear, structured explanations helped participants understand the power of statistical techniques in making informed decisions and improving technological innovations. Dr. Srikanth also shared practical tools and software widely used in the industry, which participants could explore for their own research and applications.

The session concluded with a Q&A segment from 3:15 PM to 3:20 PM, where participants asked questions related to the application of statistical methods in various fields, particularly in engineering and data science. Dr. Srikanth responded with practical advice, helping participants understand the integration of statistical methods in solving complex real-world problems.

After the Q&A session, a short break was scheduled until 3:30 PM, allowing participants to refresh before the next topic. The session resumed promptly at 3:30 PM, with Dr. Srikanth chairing the next presentation on **Advanced Quantum Mechanics and Its Application**.

In this session, Dr. Srikanth delved into the complexities of quantum mechanics, a fundamental area of physics with significant implications for technology. He began by explaining the key principles of quantum mechanics, such as wave-particle duality, quantum superposition, and entanglement, and their application in advanced technology. Dr. Srikanth discussed how these



principles are being harnessed in the development of quantum computers, quantum encryption, and other cutting-edge technologies. The session also covered the potential of quantum mechanics to revolutionize fields such as material science, computing, and communications.

The lecture then explored the real-world applications of quantum mechanics, focusing on its role in creating more efficient and powerful technologies. Dr. Srikanth shared insights into the field of quantum computing, where quantum bits (qubits) are used to perform calculations at speeds unimaginable with classical computers. He also covered the importance of quantum mechanics in fields like cryptography and secure communication, illustrating how quantum encryption can offer unbreakable security for sensitive data. Dr. Srikanth's talk was rich in content, with complex concepts explained in an accessible manner, enabling participants to grasp the immense potential of quantum technologies.

The session concluded with another Q&A segment from 4:45 PM to 4:50 PM, where participants asked questions about quantum computing, its practical challenges, and its future implications for various industries. Dr. Srikanth provided further clarification on how quantum mechanics is being applied today and the road ahead for its widespread adoption.

At 4:50 PM, Dr. Sompalli Bhavana delivered the vote of thanks, expressing her gratitude to Dr. Srikanth for his outstanding presentations on statistical methods and advanced quantum mechanics. She also thanked the participants for their enthusiastic involvement throughout the session. Dr. Bhavana acknowledged the efforts of the organizing team, sponsors, and the distinguished resource persons for making the workshop a success.

The workshop ended with a photo session from 4:55 PM to 5:00 PM, capturing the moments of the event. The group photo served as a token of appreciation for all the efforts that went into making the workshop a valuable learning experience for everyone involved.

Pre & Post Training Test was conducted to evaluate the overall impact of the workshop deliverables among the participants.



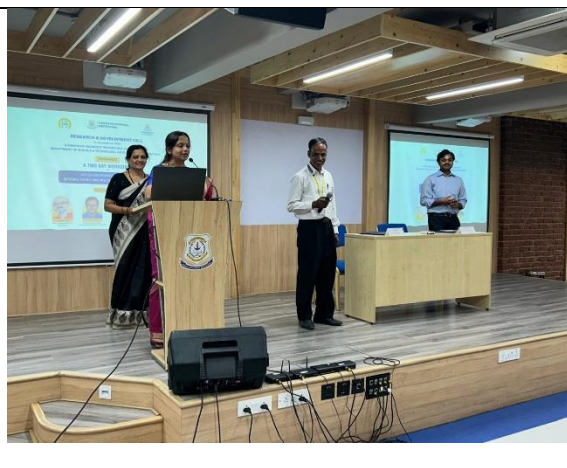
The workshop concluded with a formal valedictory ceremony, hosted by Dr. Seethalakshmi, who began by thanking all the participants and resource persons for their contributions throughout the two days. She expressed her appreciation for the rich exchange of knowledge and ideas that had taken place during the workshop. Dr. Seethalakshmi also highlighted the importance of interdisciplinary learning in bridging theory and practice, emphasizing how the sessions would contribute to shaping future innovators in the fields of applied mathematics and physics.

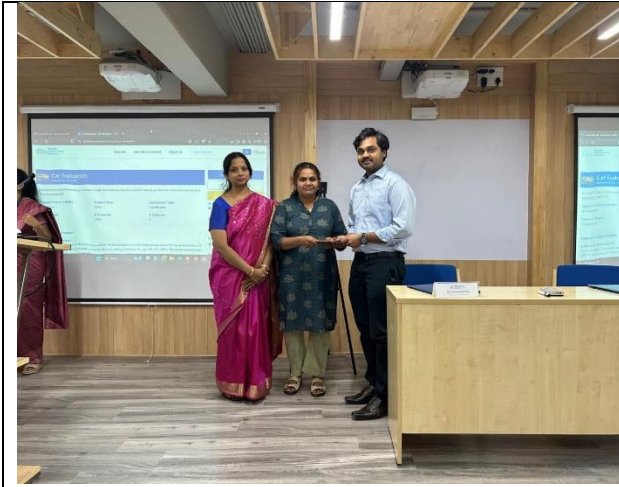
Dr. Vanishree, Dean of Research and Development at Surana College, began the distribution of certificates to all participants. She congratulated the attendees for their active participation and engagement in the sessions. Dr. Vanishree praised the collective efforts of the resource persons, faculty members, and participants in making the workshop a meaningful and successful event. She noted that the diverse backgrounds of the participants enriched the

discussions and learning experience, making the workshop an ideal platform for fostering knowledge exchange.

The vote of thanks was delivered by Dr. Sompalli Bhavana, who extended her gratitude to everyone involved in making the event a success. She thanked the participants for their enthusiasm and dedication to learning, which added tremendous value to the workshop. Dr. Bhavana also acknowledged the support of the managing trustee, Dr. Archana Surana, and the Group Director, Dr. Punith Cariappa, for their guidance and leadership. She expressed appreciation to Principal Dr. Veena K N for her continued support of such educational initiatives.

In her closing remarks, Dr. Bhavana extended heartfelt thanks to the funding agency, Karnataka Science and Technology Academy (KSTA), for their financial support. She also recognized the efforts of the IT technical staff, hospitality team, student volunteers, committee members, and the helping staff, whose hard work ensured the smooth running of the event. The workshop concluded on a positive note, with everyone leaving the ceremony with a sense of accomplishment and a renewed commitment to advancing their knowledge in applied sciences.

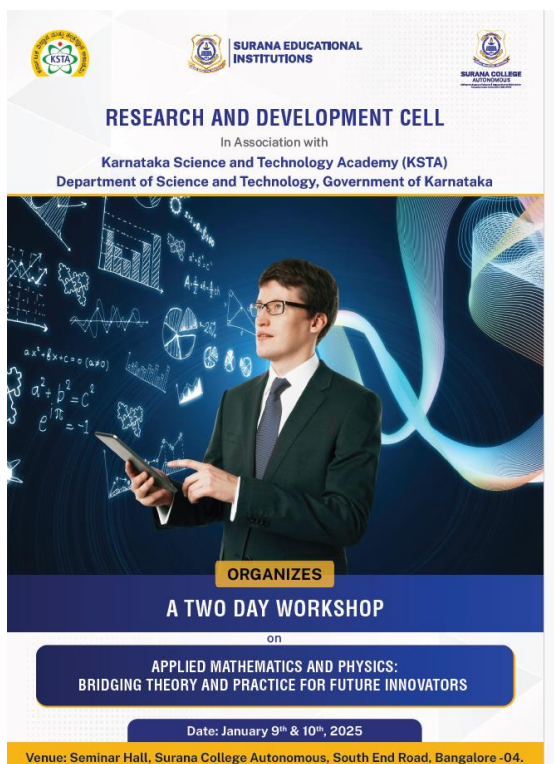






## ANNEXURES

### I. Brochure & Poster



**RESEARCH AND DEVELOPMENT CELL**  
In Association with  
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**ORGANIZES**

**A TWO DAY WORKSHOP**  
on  
**APPLIED MATHEMATICS AND PHYSICS:  
BRIDGING THEORY AND PRACTICE FOR FUTURE INNOVATORS**

Date: January 9<sup>th</sup> & 10<sup>th</sup>, 2025  
Venue: Seminar Hall, Surana College Autonomous, South End Road, Bangalore -04.

#### Preamble

Applied Mathematics and Physics are central to many scientific breakthroughs in the world. They are the building blocks of innovation and refining technology in the fields of medicines, aerospace, energy, quantum computing, computational science, nanotechnology, environmental sciences and so on largely contributing towards better understanding real-time problems and scenarios. These disciplines have been extensively contributing to industries transformation viz., healthcare, finance, engineering, life science and data science. Their interdisciplinary nature and broad applicability make them indispensable in addressing the pressing challenges of the present time.

Surana College Autonomous, Research & Consultancy Cell, is organizing two-days intensive workshop on Applied Mathematics and Physics aim to promote greater insights into both the disciplines to post-graduate students, research scholars and faculty members. The workshop will bridge theoretical foundations with practical applications, equipping students with essential skills to tackle real-world problems through research and industry approaches. The training will bring together leading experts, interactive sessions, and hands-on problem-solving exercises, creating a collaborative environment that fosters deep learning and innovation.

#### Objectives

1. To provide PG students, research scholars & faculty members with solid understanding of applied mathematics and physics concepts and methodologies.
2. To showcase practical applications of theoretical knowledge in fields of data science, quantum mechanics material science and mathematical modelling.
3. To enhance critical thinking, problem-solving and computational skills essential for research and industry careers.
4. To foster networking and collaboration between students, faculty and industry professionals.

#### Target Audience

The primary audience will be postgraduate students, research scholars and faculty members from the disciplines of mathematics, physics, engineering and related science fields.



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### Resource Persons



Dr. Anukulan Rojan  
Faculty, Proficiency Programme,  
IISc Bangalore

**Topic Coverage**  
Mathematical Foundation in Applied Sciences  
9<sup>th</sup> January 2025 10:00 AM-11:15 AM

**Topic Coverage**  
Computational Mathematics and Simulation  
9<sup>th</sup> January 2025 11:30 AM-1:00 PM



Dr. Sudev N V  
Professor, School of Science  
CHRIST (Deemed to be University), Bangalore

**Topic Coverage**  
Statistical Methods in Data Science and Engineering  
9<sup>th</sup> January 2025 2:00 PM-3:15 PM

**Topic Coverage**  
Optimization and Game Theory Applications  
9<sup>th</sup> January 2025 3:30 PM-5:00 PM



Dr. Gajanan Honnawar  
Professor & Team Leader (QualEd) Lab,  
PES University, Bangalore

**Topic Coverage**  
Data Science and Machine Learning Fundamentals  
10<sup>th</sup> January 2025 10:00 AM-11:15 AM

**Topic Coverage**  
Quantum Physics and Electronics in Innovation  
10<sup>th</sup> January 2025 11:30 AM-1:00 PM



Dr. Srikanth Kapu  
International Affairs,  
Faculty of Engineering and Technology,  
Alliance University, Bangalore

**Topic Coverage**  
Advanced Quantum Mechanics and its Application  
10<sup>th</sup> January 2025 2:00 PM-3:15 PM

**Topic Coverage**  
Industry Application and Approach towards Applied Physics  
10<sup>th</sup> January 2025 3:30-5:00 PM

### Expected Outcomes:

- Develop the understanding of how applied mathematics and physics can be utilized in various real-world scenarios through interdisciplinary approach.
- Strengthen the problem-solving, analytical and computational skills among PG Students and Scholars.
- Reinforce the motivation for research and innovation in applied mathematics and physics.
- Establish a strong collaborative network between academic fraternity, researcher and industry for future research and job opportunities.

### NOTE

1. LIMITED SEATS ONLY-First come first serve basis.
2. Research Scholars & Students must carry their College/University ID Card.
3. All the participants will receive certificate of participation, training kit and recorded session.

### Event Registration

- Last Date of registration for this event is 3<sup>rd</sup> January 2025

- Registration fees

Research Scholars & PG Students	FREE
Faculty Members & Professor for Practice	Rs. 500/-

- Registration Link: <https://forms.office.com/r/h0tRu0pQH7>

### Online payment details

Account Holder Name: PRINCIPAL SURANA COLLEGE  
Bank Name: STATE BANK OF INDIA  
Bank Branch: JAYANAGAR II BLOCK (BENGALURU)  
Account No: 41752158251  
IFSC Code: SBIN0003286

<b>Patron</b> Dr. Archana Surana Managing Trustee, Surana Educational Institutions	
<b>Chief Patron</b> Dr. Punith Cariappa Group Director, Surana Educational Institutions	
Dr. Veena K N Principal, Surana College Autonomous	Dr. Vanishree M.R. Dean, Research & Consultancy, Surana Educational Institution

For any further information please feel free to contact through  
mail: [sei-research@suranacollege.edu.in](mailto:sei-research@suranacollege.edu.in) or call on: +91 9488387238 | +91 9448223568.

### Organizing Committee Members

- Mr. Maralusiddappa T.R., Department of Mathematics
- Dr. Divya Dextin, Department of Physics
- Dr. Seethalakshmi, Department of Biotechnology
- Dr. Pooja R, Department of Biotechnology

### About the Karnataka Science & Technology Academy (KSTA)

The Karnataka Science and Technology Academy (KSTA), an autonomous organization under the Department of Science and Technology, Government of Karnataka, was established in 2005 under the chairmanship of Padma Vibhushan awardee Prof. U. R. Rao, Former Chairman, ISRO & Secretary, DOS, Government of India. KSTA's objective is to foster STEAM (Science, Technology, Engineering, Agriculture, and Mathematics) education at various levels in an educational pyramid and to popularize science among the general public in the State.

In 2022, KSTA was honored with the prestigious "National Award for Outstanding Efforts in Science and Technology Communication" by the National Council for Science and Technology Communication (NCSTC), Department of Science and Technology, Government of India.

### About the Surana College Autonomous

Established in 1995 under the GDA Foundation Trust, Surana College Autonomous is affiliated with Bangalore University under section 53(5) of the Karnataka State Universities Act, 2000 and is recognized under sections 2(f) and 12(B) of the UGC Act, 1956. The institution has been a pioneer in providing inclusive, need-based quality education to all sections of society. With a steadfast commitment to student success, the college focuses on nurturing academic excellence alongside holistic personal development. Surana College Autonomous has a proud legacy of transforming average-performing students into achievers, evidenced by numerous case studies of students excelling to earn distinctions and ranks.

Surana College Autonomous enriches the university-prescribed curriculum by integrating carefully balanced curricular and co-curricular components. This approach emphasizes value addition and experiential learning, ensuring students are equipped for both their careers and personal lives.

### Our Mission

The institution is dedicated to shaping students into self-reliant, independent thinkers who are globally competent, socially responsible, and morally grounded. Surana College Autonomous instills skills, values, and a sense of purpose in its students, enabling them to contribute meaningfully to society.



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#### Core Values

- **Freedom with Responsibility:** Students are encouraged to explore and innovate within a structured environment of discipline and accountability.
- **Research and Entrepreneurship:** The college promotes a culture of research and entrepreneurship, fostering out-of-the-box thinking and innovation.
- **Affordability and Inclusivity:** Surana College Autonomous offers quality education at affordable fees with a strict no-donation policy, reflecting its commitment to accessibility.
- **Pro-Community Practices:** Community engagement and socially impactful initiatives are embedded in the curriculum.

#### Holistic Development

Surana College Autonomous emphasizes a student-centred approach, actively involving learners in academic, co-curricular, and extension activities. Students participate in community service, contribute to sustaining an enriching academic environment, and benefit from strong parental and public support.

#### Legacy of Excellence

The institution enjoys widespread recognition among scholars, industry leaders, and socio-cultural organizations. Many corporate entities and service industries seek Surana College Autonomous graduates for their skills and professional readiness. The dedicated faculty, fostering a healthy academic relationship with students, plays a crucial role in achieving high learning outcomes.

#### Leadership and Collaboration

The college prioritizes the cultivation of leadership skills through a 360° approach. Strong management support and seamless interdepartmental coordination have been instrumental in sustaining Surana College's commitment to excellence. A shared vision of preserving the joy of learning underscores the institution's enduring success.

Surana College Autonomous stands as a beacon of affordable quality education, driving innovation and fostering values while empowering its students to thrive in a dynamic global landscape.



**SURANA EDUCATIONAL INSTITUTIONS**



#### RESEARCH & DEVELOPMENT CELL

In Association With  
**KARNATAKA SCIENCE & TECHNOLOGY ACADEMY (KSTA)**  
**DEPARTMENT OF SCIENCE & TECHNOLOGY, GOVERNMENT OF KARNATAKA**

#### ORGANIZES

#### A TWO DAY WORKSHOP

**APPLIED MATHEMATICS AND PHYSICS:**  
**BRIDGING THEORY AND PRACTICE FOR FUTURE INNOVATORS**

#### Resource Persons



**Dr. Anandhan Rajan**  
Faculty, Proficiency Programme,  
IISc, Bangalore



**Dr. Sudheer N V**  
Professor, School of Science,  
CHRIST (Deemed to be University), Bangalore



**Dr. Gaganan Hanumanth**  
Professor & Team Leader, Qualified Lab,  
PES University, Bangalore



**Dr. Srikarsh Ranga**  
International Affairs,  
Faculty of Engineering and Technology,  
Allama University, Bangalore

#### \* Registration fees

Research Scholars & PG Students	FREE
Faculty Members & Professor for Practice	Rs. 500/-

9<sup>th</sup> & 10<sup>th</sup> JANUARY

**2025**



Download Brochure

For any further information please feel free to contact through

Mail: [sel-research@suranacollege.edu.in](mailto:sel-research@suranacollege.edu.in)

Call on: +91 9488387238 | +91 9448223568.

## II. Program Schedule



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### Two Days Workshop

On

**APPLIED MATHEMATICS AND PHYSICS: BRIDGING THEORY AND PRACTICE  
FOR FUTURE INNOVATORS**

Date: January 9-10, 2025

Venue: Seminar Hall, Surana College Autonomous, South End Road, Bangalore

### Program Schedule

9 <sup>th</sup> January 2025	
INAUGURAL CEREMONY	
8:00-9:30 AM	Registration and Guest arrival
9:30-9:35 AM	Lighting of the Lamp & Invocation Song
9:35-9:40 AM	Surana Educational Institution - VT
9:40-9:45 AM	Welcome Address by <b>Dr Vanishree MR</b> , Dean, Research & Development Cell Surana Educational Institutions
9:45-9:50 AM	Inaugural address by <b>Dr Veena K N</b> Principal, Surana College Autonomous
9:50-9:55 AM	Briefing of Program & Technical Session – Dr. Seethalakshmi
9:55 AM	Vote of thanks by Dr Sompalli Bhavana
10:00 AM	Photo Session

MC- Dr Seethalakshmi

9 <sup>th</sup> January 2025	
DAY 1- TECHNICAL SESSION 1- Applied Mathematics	
10:05- 10:10 AM	Introduction to Resource Person by Dr. T R Maratusiddappa
10:05- 11:15 AM	<b>Topic: Mathematical Foundation in Applied Sciences</b> <b>Session Chair: Dr. Arulalan Rajan</b> Faculty, Proficiency Programme, IISc Bangalore
11:15-11:20 AM	Q & A Session
11:20- 11:30 AM	High Tea
11:30-1:00 PM	<b>Topic: Computational Mathematics and Simulation</b> <b>Session Chair: Dr. Arulalan Rajan</b> Faculty, Proficiency Programme, IISc Bangalore
1:00- 1:05 PM	Q & A Session
1:05- 1:10 PM	Vote of thanks by Dr Sompalli Bhavana
1:10-1:15 PM	Photo Session
1:15-2:00 PM	Lunch Break

1

Day 1- TECHNICAL SESSION 2 – Applied Mathematics	
2:00-2:05 PM	Introduction to Resource Person by Dr Pooja R
2:05-3:15 PM	<b>Topic: Statistical Methods in Data Science and Engineering</b> <b>Session Chair: Dr. Sudev N V</b> Professor, School of Science, CHRIST (Deemed to be University)
3:15-3:20 PM	Q & A Session
3:20- 3:30 PM	High Tea
3:30-4:45 PM	<b>Topic: Optimization and Game Theory Applications</b> <b>Session Chair: Dr. Sudev N V</b> Professor, School of Science, CHRIST (Deemed to be University)
4:45 – 4:50 PM	Q & A Session
4:50 – 4:55 PM	Vote of thanks by Dr Sompalli Bhavana
4:55- 5:00 PM	Photo Session

MC- Dr Seethalakshmi

10 <sup>th</sup> January 2025	
DAY 2- TECHNICAL SESSION 3 - Applied Physics	
9:55 – 10:00	Welcoming the Resource Person & Participants – Dr. Seethalakshmi
10:00- 10:05 AM	Introduction to Resource Person by Dr Farzan Tasneem M I
10:05- 11:15 AM	<b>Topic: Data Science and Machine Learning Fundamentals</b> <b>Session Chair: Dr. Gajanan Honnavar</b> Professor & and Team Leader QuaNaD Lab at PES University
11:15-11:20 AM	Q & A Session
11:20- 11:30 AM	High Tea
11:30-1:00 PM	<b>Topic: Quantum Physics and Electronics in innovation</b> <b>Session Chair: Dr. Gajanan Honnavar</b> Professor & and Team Leader QuaNaD Lab at PES University
1:00- 1:05 PM	Q & A Session
1:05- 1:10 PM	Vote of thanks by Dr Sompalli Bhavana
1:10-1:15 PM	Photo Session
1:15-2:00 PM	Lunch Break

DAY 2- TECHNICAL SESSION 4 - Applied Physics	
2:00-2:05 PM	Introduction to Resource Person by Dr. Divya
2:05-3:15 PM	<b>Topic: Statistical Methods in Data Science and Engineering</b> <b>Session Chair: Dr. Srikanth Itapu</b> International Affairs, Faculty of Engineering and Technology, Alliance University, Bangalore.
3:15-3:20 PM	Q & A Session
3:30-4:45 PM	<b>Topic: Advanced Quantum Mechanics and its Application</b> <b>Session Chair: Dr. Srikanth Itapu</b> International Affairs, Faculty of Engineering and Technology, Alliance University, Bangalore.
4:45 – 4:50 PM	Q & A Session
4:50 – 4:55 PM	Vote of thanks by Dr Sompalli Bhavana
4:55- 5:00 PM	Photo Session

MC- Dr Seethalakshmi

### III. Certificate of Participation (Sample)



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*In Association With*

**KARNATAKA SCIENCE & TECHNOLOGY ACADEMY (KSTA)  
DEPARTMENT OF SCIENCE & TECHNOLOGY, GOVERNMENT OF KARNATAKA**

### Certificate of Participation

This is to certify that

Dr. MALINI SHETTY .A.G

from Surana College has participated and successfully completed two days' workshop on  
**APPLIED MATHEMATICS AND PHYSICS: BRIDGING THEORY AND PRACTICE FOR FUTURE  
INNOVATORS** organised by Surana College Autonomous, Research and Development Cell in  
association with KSTA from 9<sup>th</sup> – 10<sup>th</sup> January 2025.

Dr. Vanishree M R  
Dean – Research & Consultancy  
Surana Educational Institutions

Dr. Ramesh A M  
Chief Executive Officer  
KSTA

Dr. Veena K N  
Principal  
Surana College Autonomous

#### IV. Registration Details and Attendance Sheet



S.No	Name	College	Signature
32	Hemavathi K.T	The National College, Autonomous ym block jaynagar	
33	Jayanthi	Nrupathunga University N.R.S. COLLEGE OF ENGINEERING	
34	JOYINTI A. GODDAR	N.R.S. COLLEGE OF ENGINEERING	
35	K. Anand	Government science college, Anupathanga university	
36	K. prasad	Suryana College, Autonomous	
37	Kayana	National College jaynagar	
38	Kishore R.	National College jaynagar	
39	Kishore N.	National College jaynagar	
40	Kishore N.	National College jaynagar	
41	Lavanya S.M	The Oxford College of Engineering, Dornahahalli	
42	Maheshwari K.S	National College jaynagar	
43	Maheshwari C	National College jaynagar	
44	Mandali	Suryana College South Field, Chicka Bangalore	
45	Mandali	Christ University	
46	Mandali Shivan Poojara	Christ (Deemed to be University) Central Campus	
47	Mera R.	CHRIST UNIVERSITY	
48	Mera R.	National College of Commerce and Science	
49	Moot, Shalika Islam	Bajajshahi university Bangalore	
50	Muthaiah Mahalingam	Indian Institute of Technology, Jammu.	
51	Muthuraju N	NATIONAL COLLEGE OF ENGINEERING	
52	Muthuraju N	CHRIST UNIVERSITY	
53	Murali Keshavi	The national college, autonomous jaynagar	
54	Narasimha	Met college of Arts Science and Commerce	
55	Narasimha	The National College, ym block jaynagar	
56	Nithila Paras S	The National College, ym block jaynagar	
57	Nithyashree B	Suryana college autonomous south end Bangalore	
58	Pavani padma	Hindustan college of arts and science	
59	Poojaprasanna D	The National college, ym block jaynagar	
60	Poojaprasanna D	The National college, ym block jaynagar	
61	Pragathi R. Manjappa	Met college of Arts Science and Commerce	
62	Pravani K. Manjappa	Met college of Arts Science and Commerce	
63	Pravani K. Manjappa	Met college of Arts Science and Commerce	
64	Pravani K. Manjappa	Met college of Arts Science and Commerce	
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S.No	Name	College	Signature
68	Bhaskar M	Surana college autonomous	
69	Bhaskar M	The National College (Autonomous)	
70	Bhaskar M	Surana college autonomous	
71	Bhaskar M	Surana college autonomous	
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## Attendance Sheet

Surana College Autonomous					
Research and Development Cell					
Two Day Workshop On APPLIED MATHEMATICS AND PHYSICS FOR THE FUTURE ENGINEERS					
Date: January 18, 2025					
Workshop Report					
S.No	Name of the Participant	Session I	Session II	Session III	Session IV
1	Mr. A				
2	Mr. B				
3	Mr. C				
4	Mr. D				
5	Mr. E				
6	Mr. F				
7	Mr. G				
8	Mr. H				
9	Mr. I				
10	Mr. J				
11	Mr. K				
12	Mr. L				
13	Mr. M				
14	Mr. N				

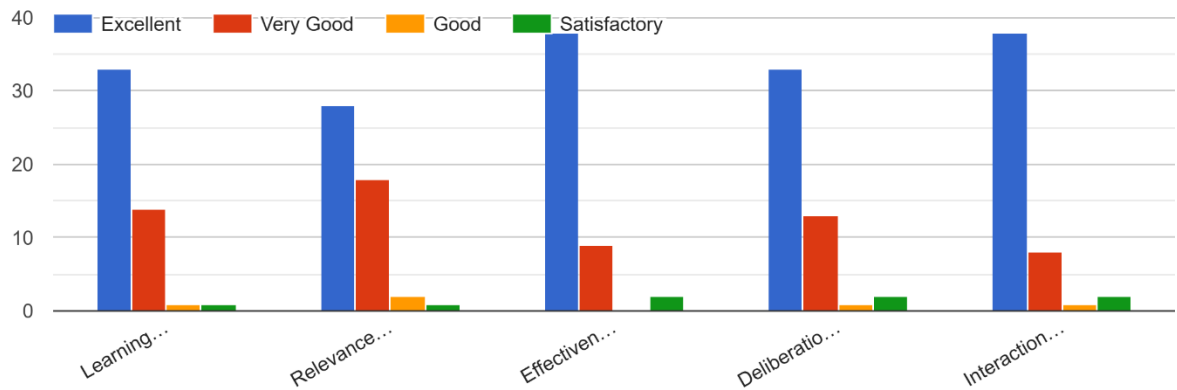
Surana College Autonomous					
Research and Development Cell					
Two Day Workshop On APPLIED MATHEMATICS AND PHYSICS FOR THE FUTURE ENGINEERS					
Date: January 18, 2025					
Workshop Report					
S.No	Name of the Participant	Session I	Session II	Session III	Session IV
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6	Mr. F				
7	Mr. G				
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11	Mr. K				
12	Mr. L				
13	Mr. M				
14	Mr. N				

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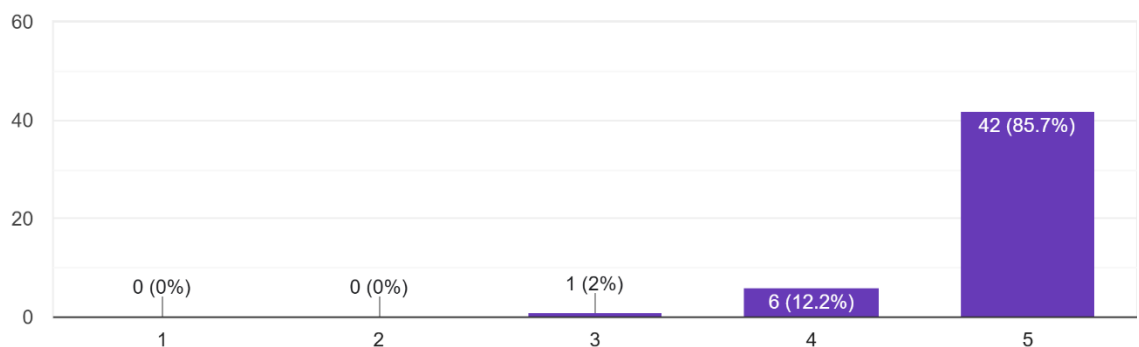
Sl. No.	Name of the Participant	Institution Name	09-01-2022, Morning Session				13-01-2022, Morning Session				16-01-2022, Afternoon Session			
			Session I	Session II	Session III	Session IV	Session I	Session II	Session III	Session IV				
26	Dr. N. S. Anand (VVP&H)	THE NATIONAL INSTITUTE, PANVELUDA National Institute of Advanced Studies Panveluda, Coimbatore-29, India Panveluda												
27	Dr. N. S. Anand													
28	Dr. N. S. Anand													
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How would you rate the Session 1- Dr. Arulalan Rajan\_Mathematical Foundation in Applied Sciences Session 2: Computational Mathematics and Simulation

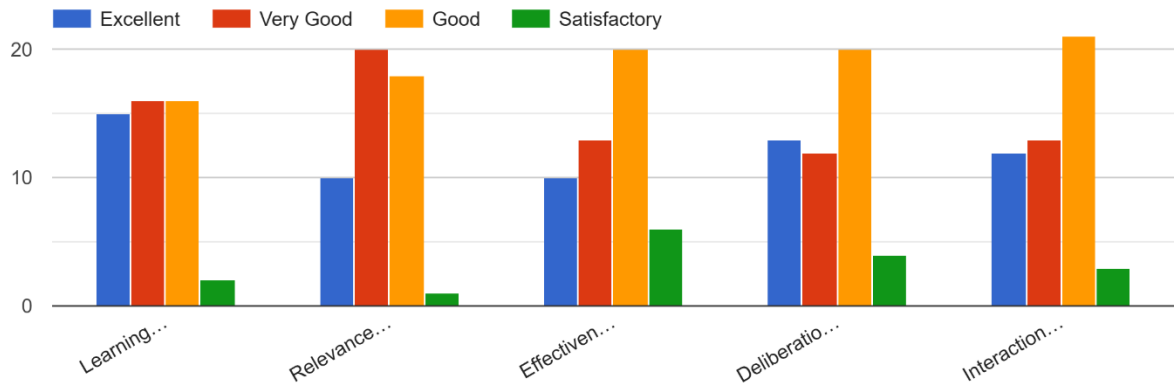


How do you rate overall sessions of Dr. Arulalan Rajan  
49 responses



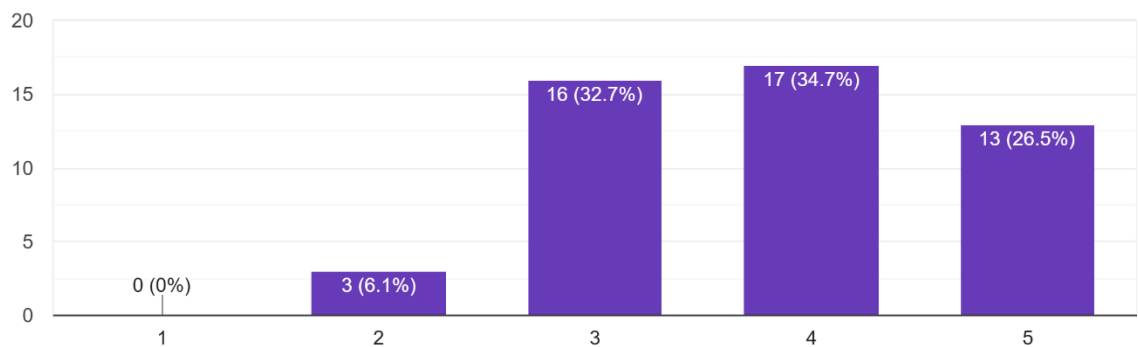
The participants gave a stellar **5-star rating** for the overall sessions conducted by Dr. Arulalan Rajan, reflecting their immense satisfaction with his overall session.

How would you rate the Session 3- Dr. Sudev N V\_ Statistical Methods in Data Science and Engineering Session 4: Optimization and Game Theory Applications



The feedback for Dr. Sudev N V's sessions on *Statistical Methods in Data Science and Engineering* and *Optimization and Game Theory Applications* was largely positive, with the majority of participants rating them as excellent, and some providing ratings of very good, good, or satisfactory.

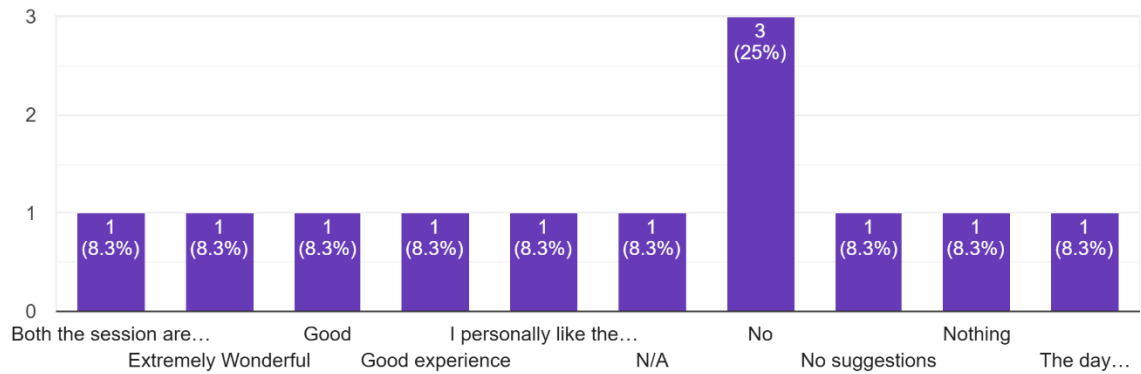
How do you rate overall sessions of Dr. Sudev N V  
49 responses



The participants gave a stellar 4-star rating for the overall sessions conducted by Dr. Sudev N V, reflecting their immense satisfaction with his presentations.

### Any other Comments or Suggestions

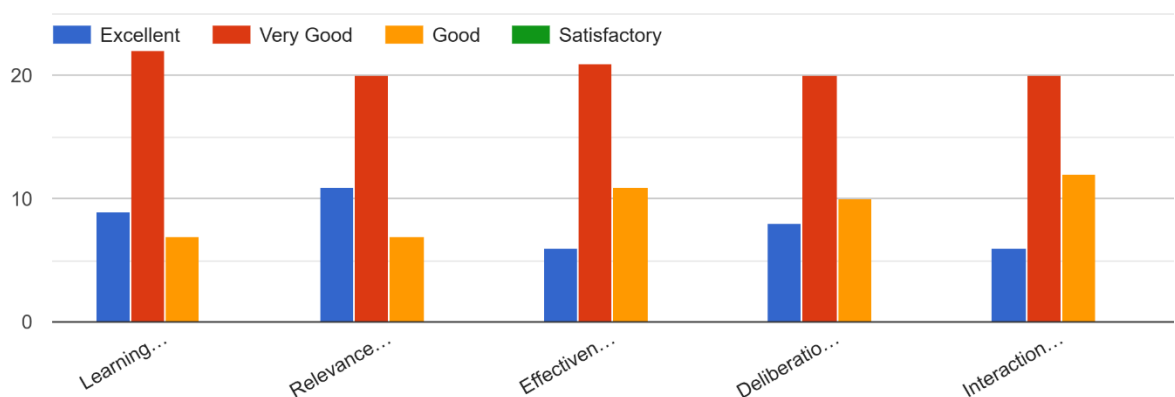
12 responses



The participants shared overwhelmingly positive feedback, describing the day as super exciting and an excellent opportunity to gain knowledge from esteemed experts. Many highlighted the sessions as extremely wonderful, very useful, and a valuable learning experience. The hospitality and simplicity of the professors were particularly appreciated, reflecting the welcoming environment of the institution.

### DAY- 2- FEEDBACK

How would you rate overall session of Dr. Gajanan Honnavar Session 1- Data Science and Machine Learning Fundamentals Session 2: Quantum Physics and Electronics in innovation

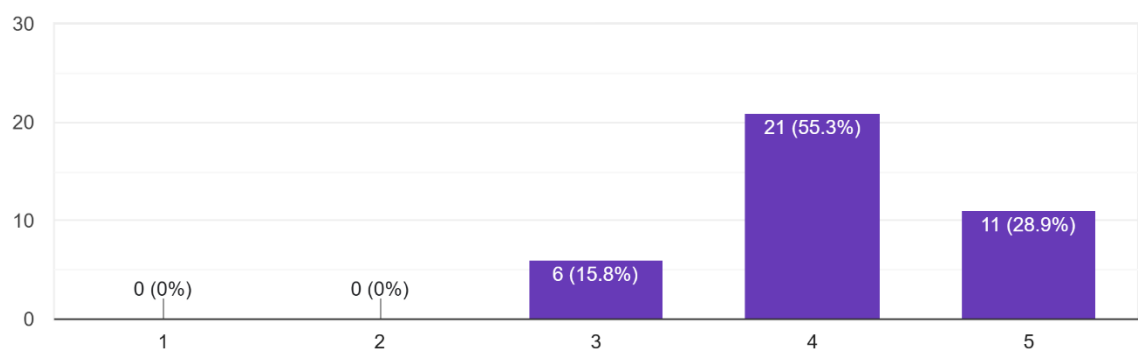


Participants provided highly positive feedback on the sessions by Dr. Gajanan Honnavar, covering *Data Science and Machine Learning Fundamentals* and *Quantum Physics and*

*Electronics in Innovation.* The majority rated the sessions as very good, highlighting the relevance of the topics to current trends and their effectiveness in bridging theoretical concepts with practical applications. Some participants rated the sessions as excellent, appreciating the depth of knowledge shared and the clarity of explanations. A few rated the sessions as good, suggesting room for enhanced interaction. Overall, the sessions were engaging, informative, and well-aligned with the workshop's objectives.

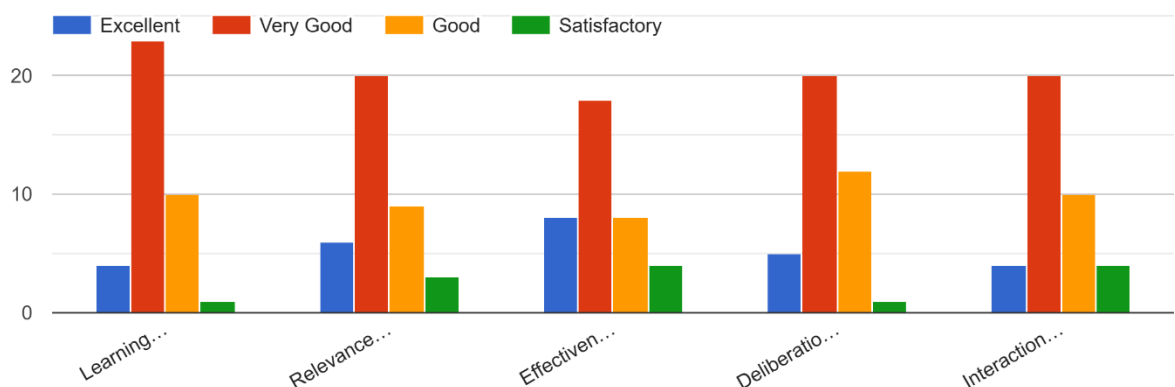
How do you rate overall sessions of Dr. Gajanan Honnavar

38 responses



The participants gave a stellar 4-star rating for the overall sessions conducted by Dr. Gajanan, reflecting their immense satisfaction with his presentations.

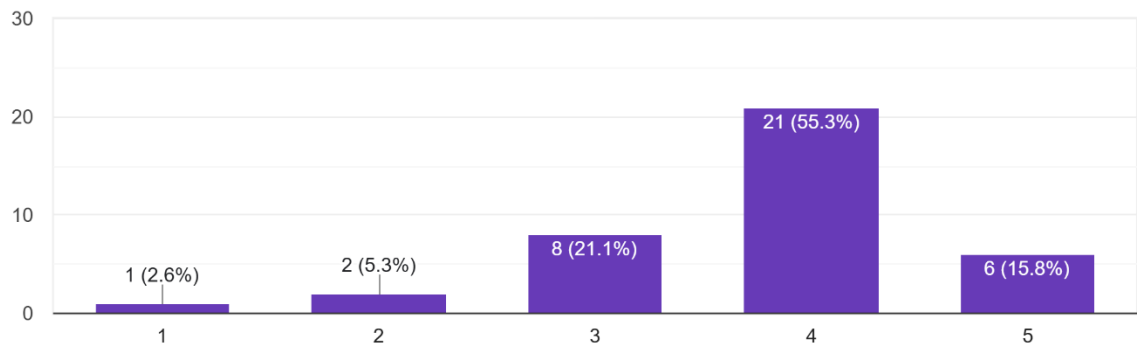
How would you rate overall session of Dr. Srikanth Itapu Session 1- Statistical Methods in Data Science and Engineering Session 2: Advanced Quantum Mechanics and its Application



The sessions by Dr. Srikanth Itapu on *Statistical Methods in Data Science and Engineering* and *Advanced Quantum Mechanics and its Application* received mixed feedback from participants. Many found the sessions to be excellent or very good, appreciating the relevance and depth of the topics covered, as well as the clear link between theory and practical applications. Some participants rated the sessions as good or satisfactory, indicating that while the content was informative, certain advanced concepts could have been made more accessible. The overall interaction and engagement were commendable, with participants valuing the opportunity to ask questions and gain insights from an expert.

How do you rate overall sessions of Dr. Srikanth Itapu

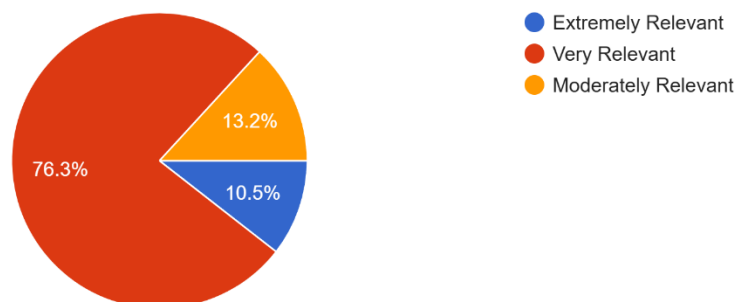
38 responses



The participants gave a stellar 4-star rating for the overall sessions conducted by Dr. Srikanth Itapu, reflecting their immense satisfaction with his presentations.

How would you rate the relevance of the topics covered in the workshop to your academic/professional growth?

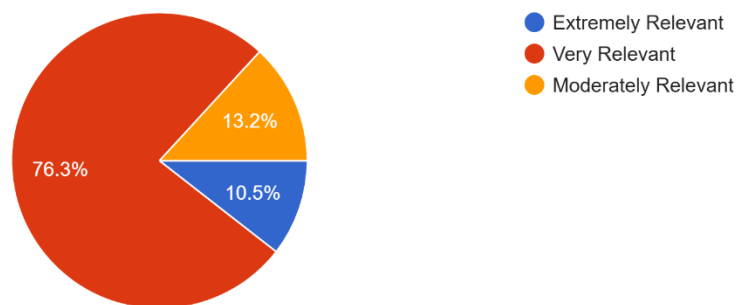
38 responses



The majority of participants found the topics covered in the workshop to be highly relevant to their academic and professional growth, with many rating them as *very relevant*. Some participants rated the relevance as *excellent*, highlighting the significance of the content in advancing their knowledge and skills. A few others deemed the topics *relevant*, indicating that while the sessions were informative, they could have benefited from more direct application to their specific areas of expertise. Overall, the workshop successfully aligned with the participants' expectations for growth in their respective fields.

How would you rate the relevance of the topics covered in the workshop to your academic/professional growth?

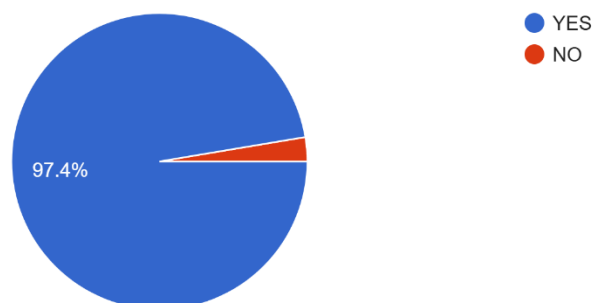
38 responses



A majority of participants, 52%, strongly agreed that the workshop schedule was well-organized and communicated clearly.

In future would you like to attend this kind of Workshops/Seminars/Conferences?

38 responses

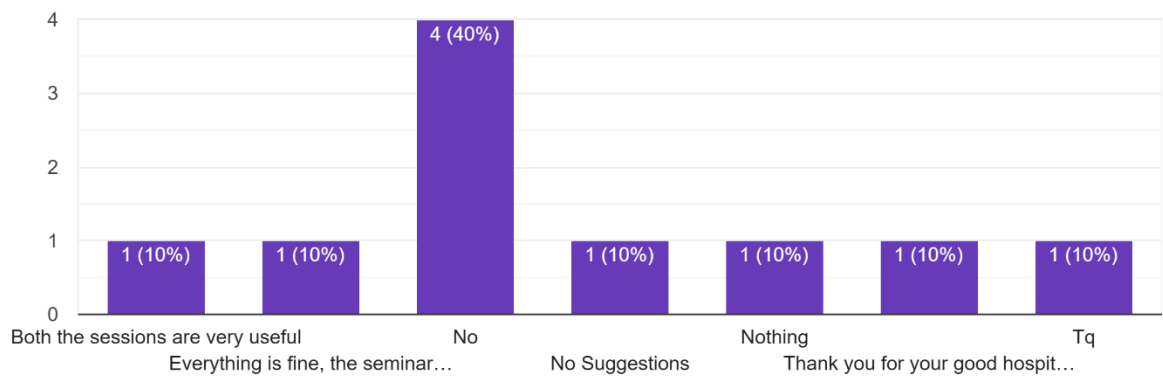


An overwhelming 97.4% of participants expressed interest in attending similar workshops, seminars, or conferences in the future. This indicates a strong positive response to the event and suggests that the content, structure, and overall experience were highly valued by the

participants. It also highlights the demand for more opportunities in these areas, reflecting the relevance and quality of the workshop.

#### Any other Comments or Suggestions

10 responses



Participants found the sessions to be extremely useful, highlighting the practical application of the topics discussed.