CIRCULAR

ARKA JAIN University
Jharkhand

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Ref. No. AJU/AD/ENGG/176/2024-25 **Date: 08-01-2025**

The expert lecture session on **"Physics of Nanomaterials"** is going to be organized by **Department of Electrical and Electronics Engineering**, School of Engineering & IT, in association with Science Club, ARKA JAIN University on 19th February, 2025 at 2:00 pm for Diploma and UG Students. The session will be conducted in online mode. Students are invited to register for the same using the link provide.

Link for registration: https://forms.gle/bEWfH2PzLbqQcLYy5

Mode of learning: Online Mode

Last Date for Registration: 18/01/2025

Coordinators:
Dr. Jonaki Mukherjee (dr.jonaki@arkajainuniversity.ac.in), 8902464892

Dr. Ashwini Kumar
Assistant Dean
School of Engg. & IT
ARKA JAIN University
Jharkhand-832108

Asst. Dean
School of Engg. & IT
ARKA JAIN University

Copy for information & necessary action please: -

1. PS to The Vice-Chancellor
2. PS to The Director
3. PS to DSW/Director Campus
4. Controller of Examination for information
5. PS to The Registrar
6. In charge Web services for Website
7. Notice Board
8. Guard File

EXPERT LECTURE ON "PHYSICS OF NANOPARTICLES" HELD FROM 19TH FEBRUARY 2025"

Date of Event	**19th February 2025**
Name of the Event	**Expert Lecture Series "Physics of Nanoparticles"**
Type of the Event	**Expert Lecture**
Conducted by	**Department of Electrical and Electronics Engineering, School of Engineering & IT, AJU in association with Science Club**
Co-Ordinator	Dr. Jonaki Mukherjee, Assistant Professor, Department of Electrical and Electronics Engineering, ARKA JAIN University, Jamshedpur, Jharkhand (dr.jonaki@arkajainuniversity.ac.in)
No. Of Participants	40

Objective: To gain the Knowledge to implement multidisciplinary concepts and ideas for the development of nanotechnologies.
Nanophysics is known to be an interdisciplinary field connecting physics, chemistry, life sciences, and medicine. The nanomaterial physics is an important interface to all these sciences and involves study of nanomaterials electronic, structural, optical or thermal characteristics behavior. The chapter discusses the fundamental concepts of nanomaterial physics highlighting the role of physics in formation of the nanoparticles. The rationale of nanoparticle physics with diverse functions in allied areas is explained. This also includes developing newer components and materials taking into consideration the physics of nanomaterials and discussion on self-assembly of nanostructures.
To understand the fundamental scientific concepts, principles and their applications is expected at the end of this course.

Description

On 19th February. 2025, an expert lecture session titled "Physics of Nanoparticles" was conducted in online mode. The event witnessed enthusiastic participation from 40 students eager to delve into the Nanotechnology.

Dr.Sudipta Som, Assistant Professor, Department of Physics, Shiv Nadar University, Chennai, served as the distinguished speaker for the session. Dr. Sudipta Som is an accomplished and dedicated researcher with extensive postdoctoral experience in chemical engineering and physics research. He boasts a robust academic pedigree, having pursued degrees at prestigious institutions such as the Indian Institute of Technology ISM Dhanbad and the University of Calcutta. Before joining Shiv Nadar University Chennai, Dr. Som spent nearly 8 years conducting postdoctoral research at the University of the Free State in South Africa and National Taiwan University in Taiwan. Throughout his postdoctoral research tenure, he collaborated with several lighting industries, including BenQ Computer, NanoLumi, Nemoto, and FoxConn. Dr. Som is highly proficient in data processing and analysis software, demonstrating his ability to handle complex research data effectively. His research interests primarily focus on developing microstructured and nanostructured materials for advanced illumination technology, particularly warm white light emitting diodes (wLED) and high-resolution display devices. Additionally, he has developed luminescence materials for various applications such as surveillance camera monitoring, fingerprint detection, security appliances, temperature sensing, and dark glow applications. Dr. Som's expertise spans nanomaterials, quantum dots, luminescent materials, 2D materials, and smart materials, making him a valuable contributor to interdisciplinary scientific research. His significant research contributions are evident in his publication record, which includes over 50 papers in esteemed international journals, with an impressive h-index of 41 and an i10 index of 90.

Dr. Som delivered a highly informative talk focusing on the thrust Area of nanoparticles including white Light emitting Diode (LED), cancer therapy and medicine. He also focused on the versatile application of nanotechlnology on modern day drug delivery system, display panels, super computers. He also explained how the natural science (Physics) related to the size change and surface to volume ratio changes the properties of the nanoparticle compared to the bulk material.

The objective of this expert lecture is enabling the students to know the basics of Physics of nanoparticles, focusing on the size change and surface to volume ratio. The students will get an insight on the wide application of nanoparticles in various medical field, white light emitting diode, display screen etc .

The lecture concluded with an interactive Q&A session, during which students enthusiastically posed queries to the speakers, seeking further clarification and guidance on various aspects of nanoparticles. Expert's responses provided valuable insights, further enriching the learning experience for the participants. The event concluded with a heartfelt vote of thanks extended to Dr.Sudipta som for her enlightening and engaging lecture, as well as to all the participants for their active involvement and enthusiasm.

Outcomes

1. Quantum Effects

- **Discrete energy levels**: At the nanoscale, electrons are confined to small spaces, leading to quantized energy levels.
- **Quantum tunneling**: Nanoparticles can exhibit quantum tunneling, where particles pass through barriers they normally couldn't in larger structures.
- **Size-dependent properties**: The optical, electrical, and thermal properties can be dramatically altered as the size of the particle decreases.

2. Increased Surface Area

- **Surface-to-volume ratio**: Nanoparticles have a much larger surface area per unit mass compared to bulk materials. This can enhance chemical reactivity and catalysis.
- **Surface energy**: The increased surface area can cause significant changes in surface energy, affecting the behavior of nanoparticles in different environments (e.g., water, air).

3. Optical Properties

- **Plasmon resonance**: Some nanoparticles (like gold or silver) can resonate with light at specific wavelengths, leading to phenomena like surface plasmon resonance (SPR).
- **Tuning color**: Nanoparticles can exhibit size-dependent optical properties, allowing the color to shift based on their size.

4. Mechanical Properties

- **Strength and elasticity**: Nanoparticles or nanostructured materials can be much stronger than their bulk counterparts, exhibiting enhanced mechanical properties such as hardness and flexibility.
- **Size effects**: Nanomaterials may have improved wear resistance, fatigue strength, and resilience to deformation.

5. Electrical and Magnetic Properties

- **Conductivity and resistivity**: Electrical properties of nanoparticles can vary, with some showing superconductivity at low temperatures or unique conductive properties due to quantum effects.
- **Magnetism**: Magnetic nanoparticles exhibit unusual magnetic behavior, such as superparamagnetism, which has applications in data storage and biomedical fields.

6. Thermal Properties

- **Thermal conductivity**: Nanoparticles may have different thermal conductivities than bulk materials due to phonon scattering and other effects.
- **Heat capacity**: The heat capacity of nanoparticles can also be different from that of bulk materials, depending on their size and structure.

7. Applications in Medicine

- **Drug delivery**: Nanoparticles are used in drug delivery systems due to their ability to target specific cells, release drugs in a controlled manner, and penetrate biological barriers.
- **Imaging**: Nanoparticles are increasingly used in medical imaging (e.g., in MRI or CT scans) due to their ability to enhance the contrast and precision of images.

8. Environmental and Energy Applications

- **Catalysis**: Nanoparticles are widely used as catalysts in various chemical reactions due to their high surface area and reactivity.
- **Energy storage**: They play a critical role in the development of more efficient batteries, fuel cells, and solar cells.
- **Environmental remediation**: Nanoparticles are also being used to clean up pollutants in water or soil due to their ability to adsorb contaminants or degrade pollutants.

POSTER OF THE EVENT

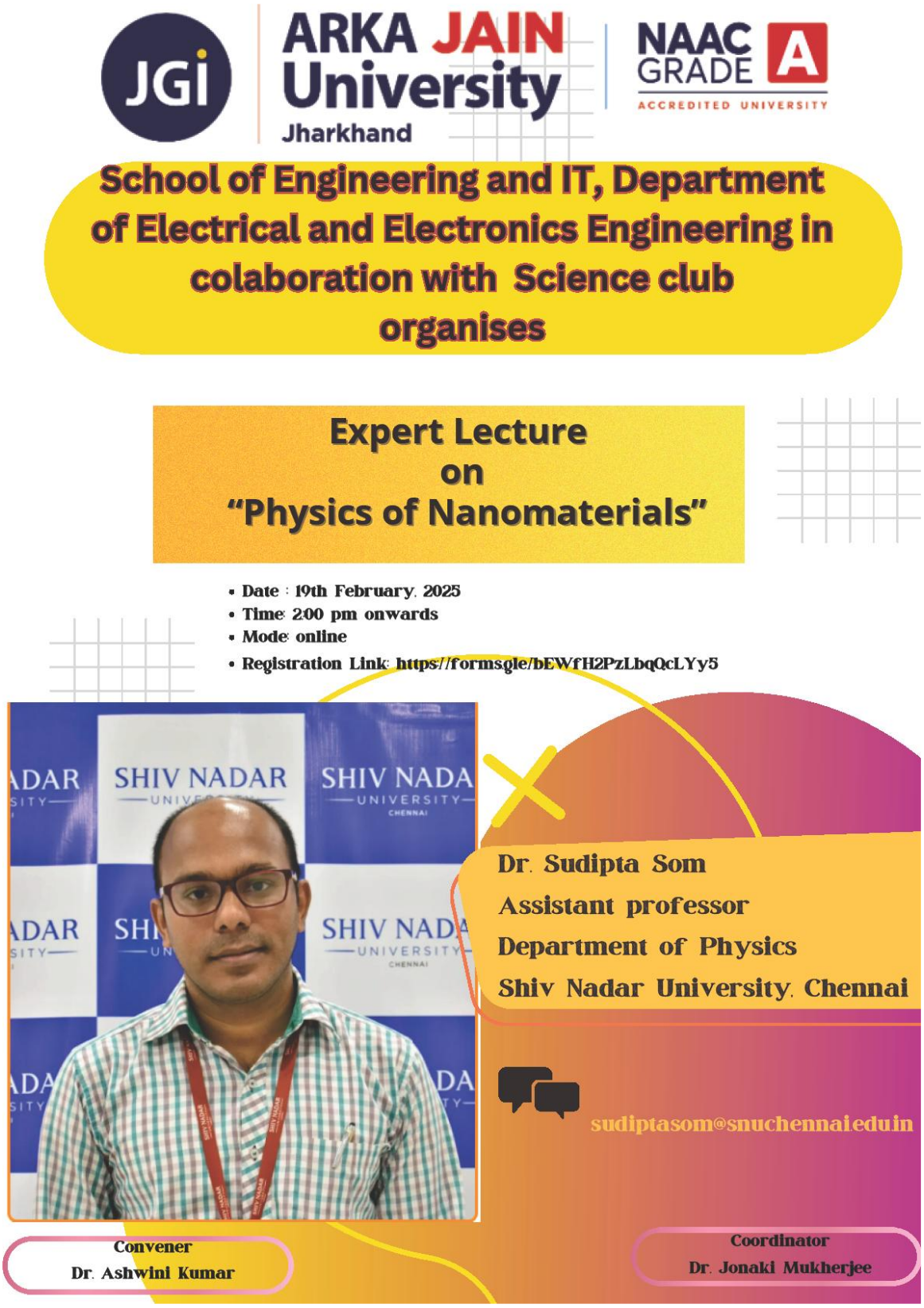


Figure 1: Poster of the expert lecture: "Physics of Nanoparticles"

PHOTOS OF THE EVENT

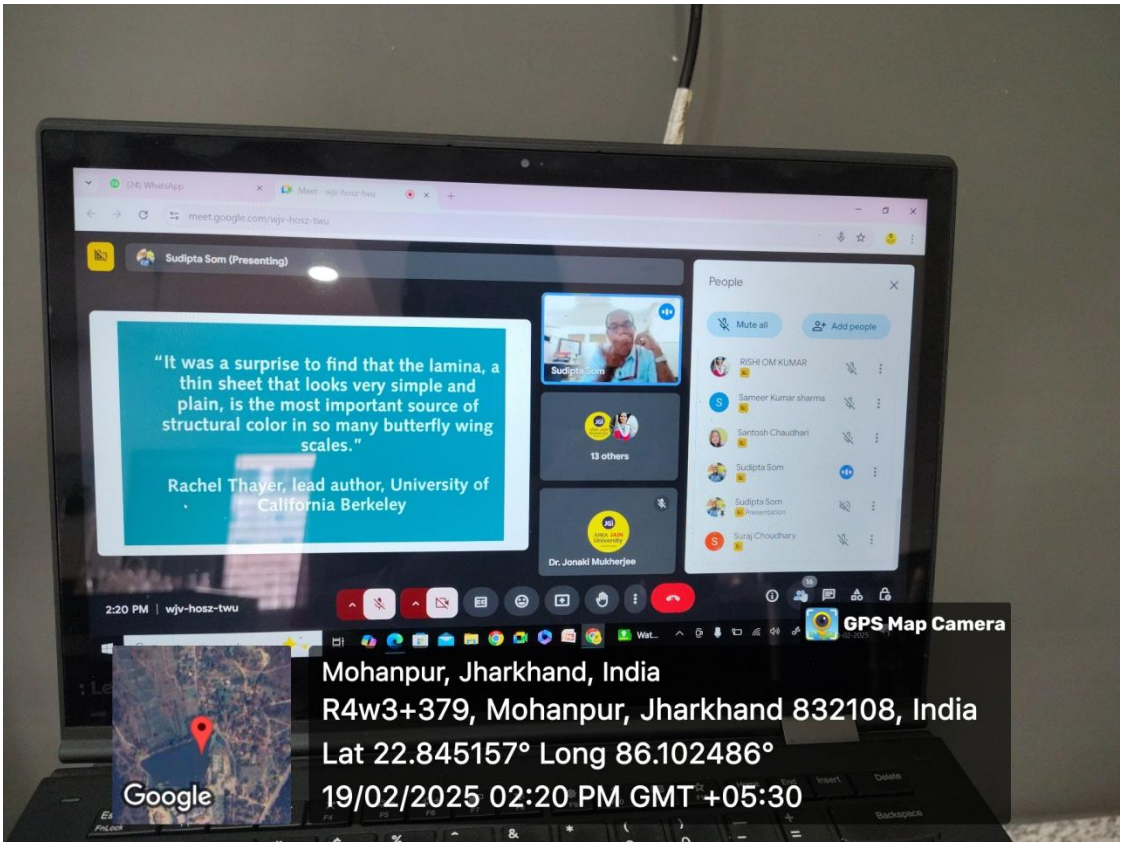


Fig 2. Lecture delivered by Speaker

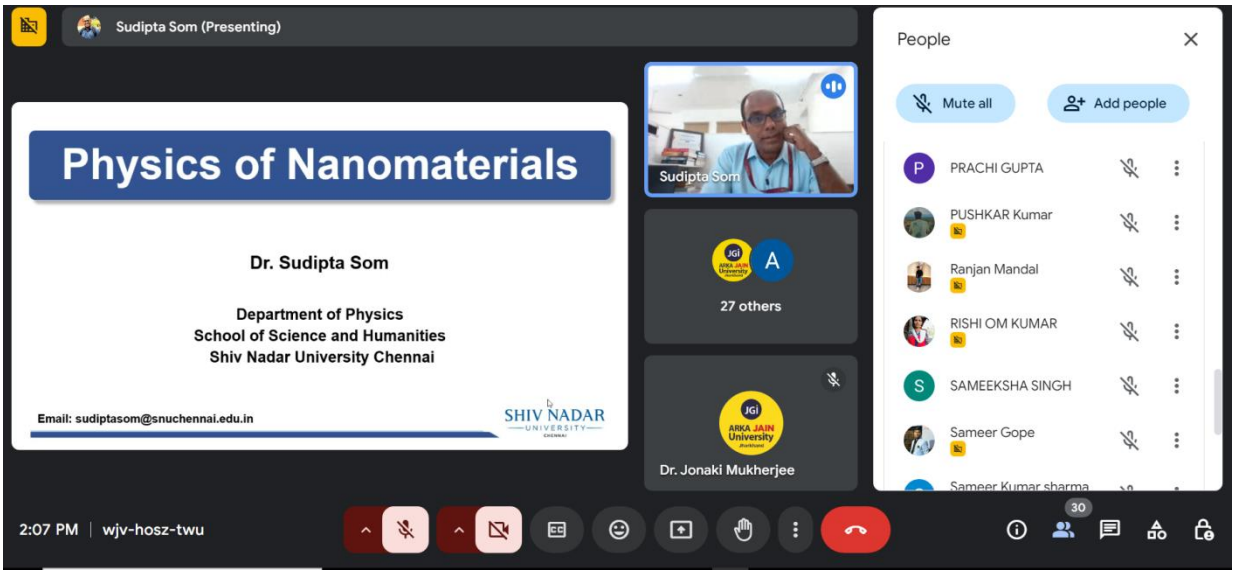


Fig 3. Lecture delivered by Speaker

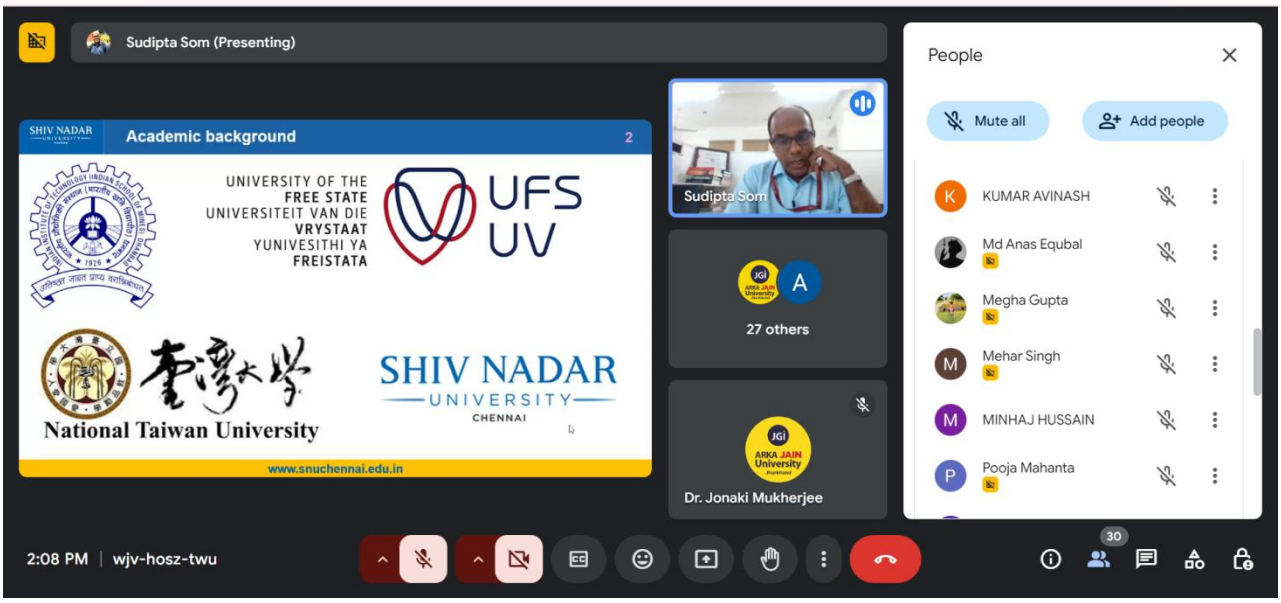


Fig 4. Lecture delivered by Speaker

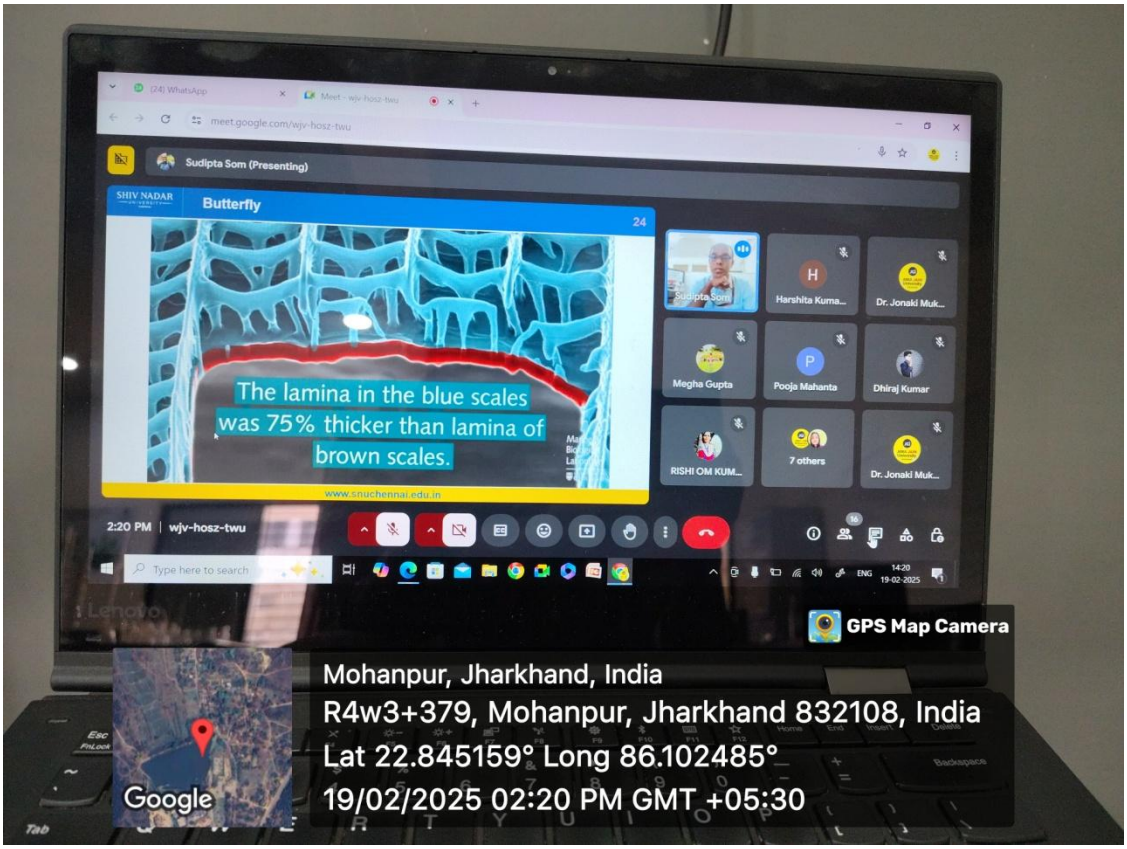


Fig 5. Lecture delivered by Speaker

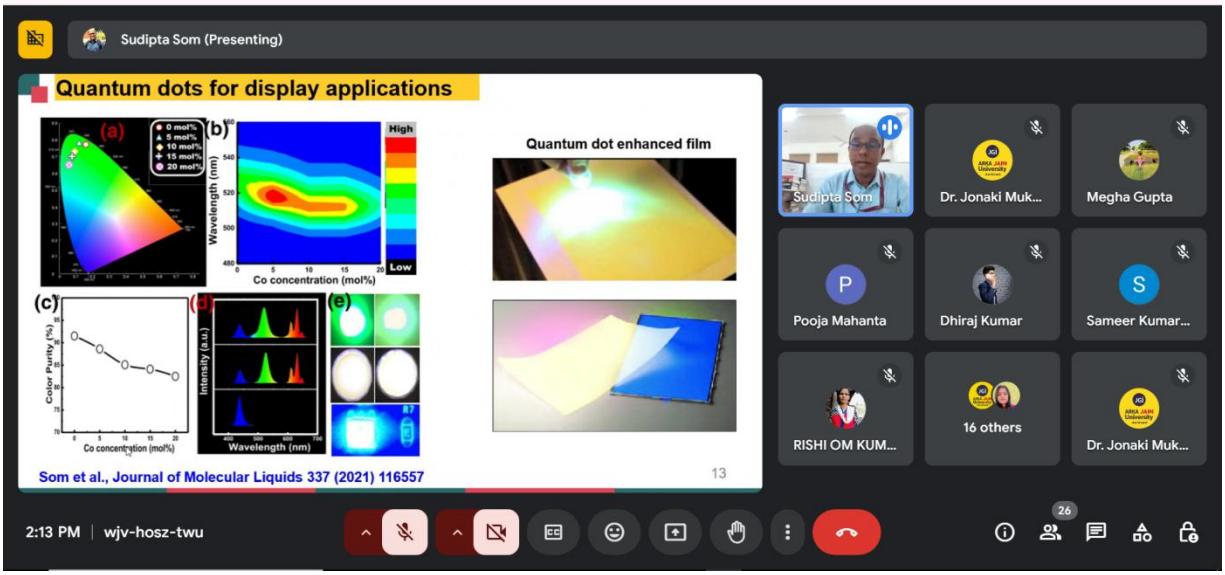
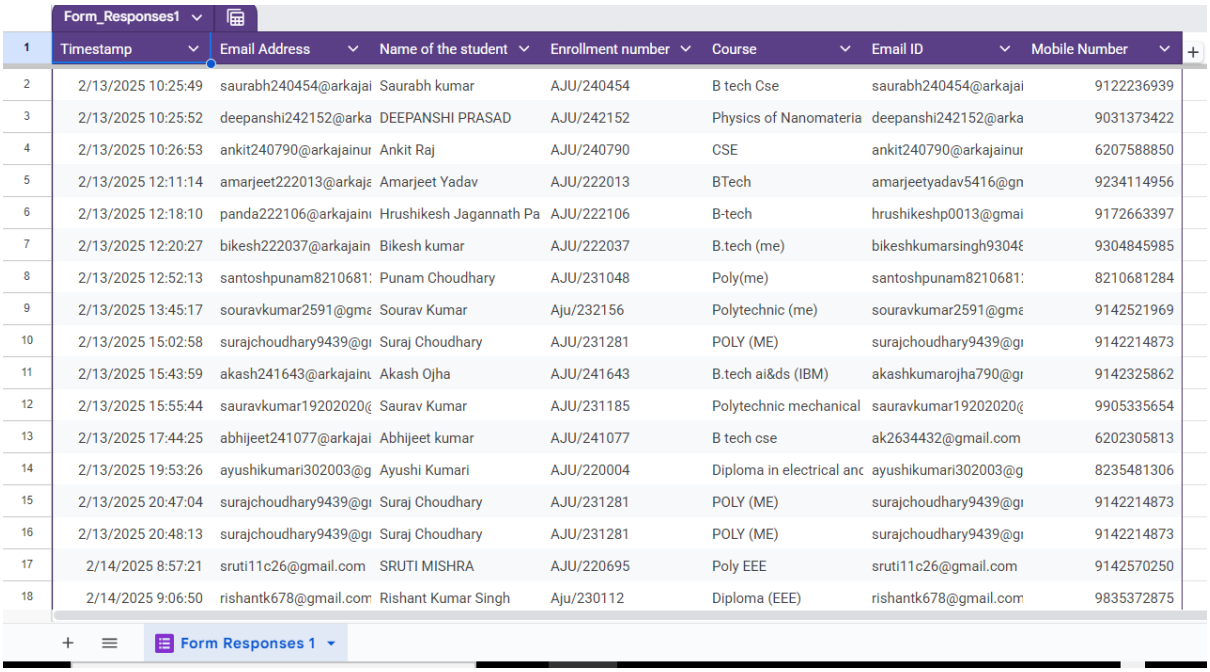


Fig 6. Lecture delivered by Speaker

List of Participants and Attendance Sheet:



Form_Responses1

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2/13/2025 10:25:52	deepanshi242152@arka	DEEPANSHI PRASAD	AJU/242152	Physics of Nanomateria	deepanshi242152@arka	9031373422
2/13/2025 10:26:53	ankit240790@arkajainur	Ankit Raj	AJU/240790	CSE	ankit240790@arkajainur	6207588850
2/13/2025 12:11:14	amarjeet222013@arkaja	Amarjeet Yadav	AJU/222013	BTech	amarjeetyadav5416@gn	9234114956
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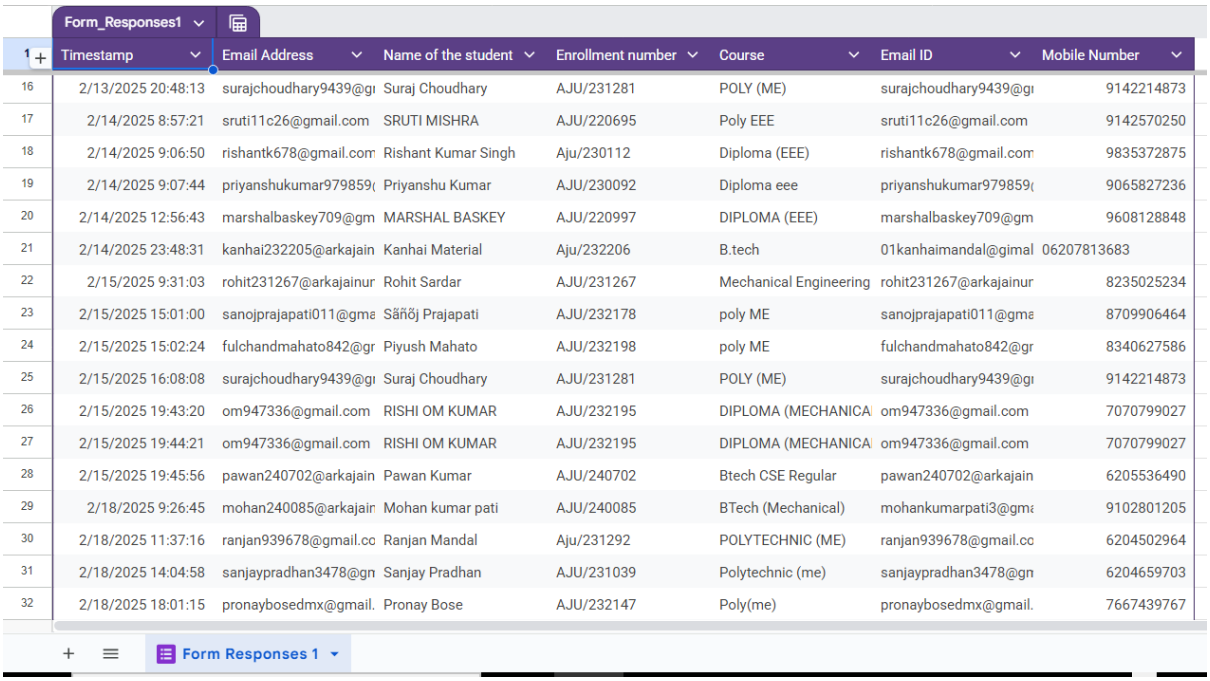
2/13/2025 12:20:27	bikesh222037@arkajain	Bikesh kumar	AJU/222037	B.tech (me)	bikeshkumarsingh9304	9304845985
2/13/2025 12:52:13	santoshpunam8210681	Punam Choudhary	AJU/231048	Poly(me)	santoshpunam8210681	8210681284
2/13/2025 13:45:17	souravkumar2591@gma	Sourav Kumar	Aju/232156	Polytechnic (me)	souravkumar2591@gma	9142521969
2/13/2025 15:02:58	surajchoudhary9439@gı	Suraj Choudhary	AJU/231281	POLY (ME)	surajchoudhary9439@gı	9142214873
2/13/2025 15:43:59	akash241643@arkajainu	Akash Ojha	AJU/241643	B.tech ai&ds (IBM)	akashkumarojha790@gı	9142325862
2/13/2025 15:55:44	sauravkumar19202020(	Saurav Kumar	AJU/231185	Polytechnic mechanical	sauravkumar19202020(	9905335654
2/13/2025 17:44:25	abhijeet241077@arkajai	Abhijeet kumar	AJU/241077	B tech cse	ak2634432@gmail.com	6202305813
2/13/2025 19:53:26	ayushikumari302003@g	Ayushi Kumari	AJU/220004	Diploma in electrical anc	ayushikumari302003@g	8235481306
2/13/2025 20:47:04	surajchoudhary9439@gı	Suraj Choudhary	AJU/231281	POLY (ME)	surajchoudhary9439@gı	9142214873
2/13/2025 20:48:13	surajchoudhary9439@gı	Suraj Choudhary	AJU/231281	POLY (ME)	surajchoudhary9439@gı	9142214873
2/14/2025 8:57:21	sruti11c26@gmail.com	SRUTI MISHRA	AJU/220695	Poly EEE	sruti11c26@gmail.com	9142570250
2/14/2025 9:06:50	rishantk678@gmail.com	Rishant Kumar Singh	Aju/230112	Diploma (EEE)	rishantk678@gmail.com	9835372875

Form Responses 1



Form_Responses1

Timestamp	Email Address	Name of the student	Enrollment number	Course	Email ID	Mobile Number
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2/14/2025 8:57:21	sruti11c26@gmail.com	SRUTI MISHRA	AJU/220695	Poly EEE	sruti11c26@gmail.com	9142570250
2/14/2025 9:06:50	rishantk678@gmail.com	Rishant Kumar Singh	Aju/230112	Diploma (EEE)	rishantk678@gmail.com	9835372875
2/14/2025 9:07:44	priyanshukumar979859(	Priyanshu Kumar	AJU/230092	Diploma eee	priyanshukumar979859(	9065827236
2/14/2025 12:56:43	marshalbaskey709@gm	MARSHAL BASKEY	AJU/220997	DIPLOMA (EEE)	marshalbaskey709@gm	9608128848
2/14/2025 23:48:31	kanhai232205@arkajain	Kanhai Material	Aju/232206	B.tech	01kanhaimandal@gimal	06207813683
2/15/2025 9:31:03	rohit231267@arkajainur	Rohit Sardar	AJU/231267	Mechanical Engineering	rohit231267@arkajainur	8235025234
2/15/2025 15:01:00	sanojprajapati011@gma	Sãñõj Prajapati	AJU/232178	poly ME	sanojprajapati011@gma	8709906464
2/15/2025 15:02:24	fulchandmahato842@gr	Piyush Mahato	AJU/232198	poly ME	fulchandmahato842@gr	8340627586
2/15/2025 16:08:08	surajchoudhary9439@gı	Suraj Choudhary	AJU/231281	POLY (ME)	surajchoudhary9439@gı	9142214873
2/15/2025 19:43:20	om947336@gmail.com	RISHI OM KUMAR	AJU/232195	DIPLOMA (MECHANICA	om947336@gmail.com	7070799027
2/15/2025 19:44:21	om947336@gmail.com	RISHI OM KUMAR	AJU/232195	DIPLOMA (MECHANICA	om947336@gmail.com	7070799027
2/15/2025 19:45:56	pawan240702@arkajain	Pawan Kumar	AJU/240702	Btech CSE Regular	pawan240702@arkajain	6205536490
2/18/2025 9:26:45	mohan240085@arkajain	Mohan kumar pati	AJU/240085	BTech (Mechanical)	mohankumarpati3@gma	9102801205
2/18/2025 11:37:16	ranjan939678@gmail.co	Ranjan Mandal	Aju/231292	POLYTECHNIC (ME)	ranjan939678@gmail.co	6204502964
2/18/2025 14:04:58	sanjaypradhan3478@gn	Sanjay Pradhan	AJU/231039	Polytechnic (me)	sanjaypradhan3478@gn	6204659703
2/18/2025 18:01:15	pronaybosedmx@gmail.	Pronay Bose	AJU/232147	Poly(me)	pronaybosedmx@gmail.	7667439767

Form Responses 1

Form_Responses1

	Timestamp	Email Address	Name of the student	Enrollment number	Course	Email ID	Mobile Number
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31	2/18/2025 14:04:58	sanjaypradhan3478@gn	Sanjay Pradhan	AJU/231039	Polytechnic (me)	sanjaypradhan3478@gn	6204659703
32	2/18/2025 18:01:15	pronaybosedmx@gmail.	Pronay Bose	AJU/232147	Poly(me)	pronaybosedmx@gmail.	7667439767
33	2/18/2025 21:48:31	ankita241166@arkajainu	Ankita Kumari	AJU/241166	BTech CSE	ankita	9304413532
34	2/19/2025 9:21:34	sameerkumar02303@gr	Sameer Kumar Sharma	Aju/240248	Electrical and electronic	kumarsharmasameer91	7209607350
35	2/19/2025 9:25:54	prem.suman@arkajainu	Prem Nath Suman	1746	Faculty	prem.suman@arkajainu	9304647645
36	2/19/2025 12:04:27	rishantk678@gmail.com	Rishant Kumar Singh	AJU/230112	Diploma EEE	rishantk678@gmail. Cor	9935372875
37	2/19/2025 13:32:35	poojamahanta2004@gn	Pooja Mahanta	AJU/231041	Diploma Mechanical	poojamahanta2004@gn	7381685853
38	2/19/2025 13:34:28	gmegha137@gmail.com	Megha Kumari	Aju/231491	Poly (me)	gmegha137@gmail.com	8207330466
39	2/19/2025 13:34:29	dhirajkumar44290@gma	Dhiraj Kumar	AJU/231623	Poly Me	dhirajkumar44290@gma	8252503487
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41	2/21/2025 8:51:01	rohitgoari384@gmail.co	Rohit Kumar gorai	AJU/231737	Poly (me)	rohitgorai12346@gmail.	6201819022
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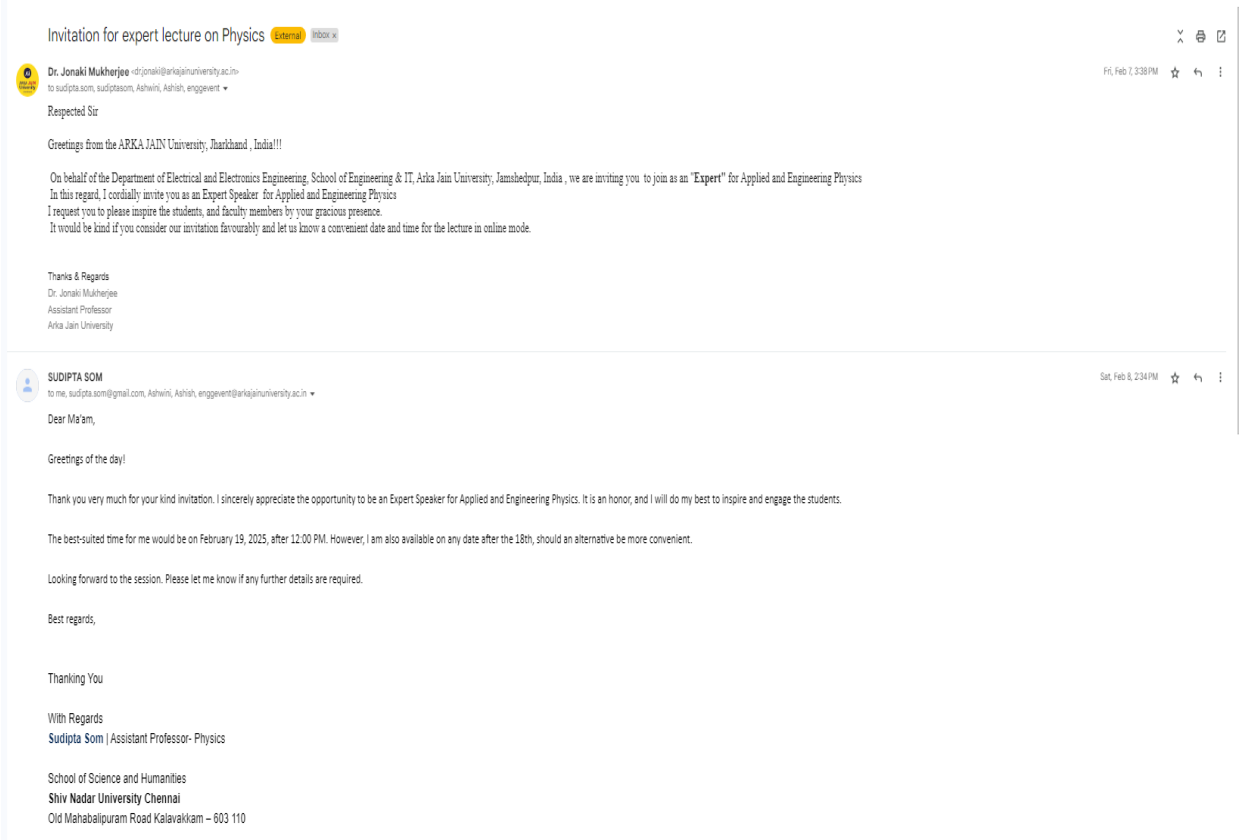
Form Responses 1

Expert Lecture Email to the Resource person



Invitation for expert lecture on Physics External Inbox ×

Dr. Jonaki Mukherjee <dr.jonaki@arkajainuniversity.ac.in> Fri, Feb 7, 3:38 PM
to sudipta.som, sudiptasom, Ashwini, Ashish, enggevent

Respected Sir

Greetings from the ARKA JAIN University, Jharkhand , India!!!

On behalf of the Department of Electrical and Electronics Engineering, School of Engineering & IT, Arka Jain University, Jamshedpur, India , we are inviting you to join as an "**Expert**" for Applied and Engineering Physics
In this regard, I cordially invite you as an Expert Speaker for Applied and Engineering Physics
I request you to please inspire the students, and faculty members by your gracious presence.
It would be kind if you consider our invitation favourably and let us know a convenient date and time for the lecture in online mode.

Thanks & Regards
Dr. Jonaki Mukherjee
Assistant Professor
Arka Jain University

SUDIPTA SOM Sat, Feb 8, 2:34 PM
to me, sudipta.som@gmail.com, Ashwini, Ashish, enggevent@arkajainuniversity.ac.in

Dear Ma'am,

Greetings of the day!

Thank you very much for your kind invitation. I sincerely appreciate the opportunity to be an Expert Speaker for Applied and Engineering Physics. It is an honor, and I will do my best to inspire and engage the students.

The best-suited time for me would be on February 19, 2025, after 12:00 PM. However, I am also available on any date after the 18th, should an alternative be more convenient.

Looking forward to the session. Please let me know if any further details are required.

Best regards,

Thanking You

With Regards
Sudipta Som | Assistant Professor- Physics

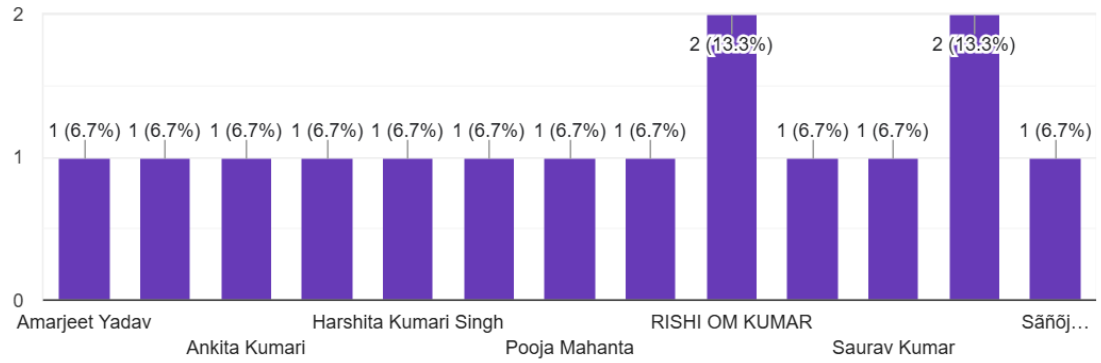
School of Science and Humanities
Shiv Nadar University Chennai
Old Mahabalipuram Road Kalavakkam – 603 110

Feedback by Students

Name of the student

Copy chart

15 responses



Enrollment number

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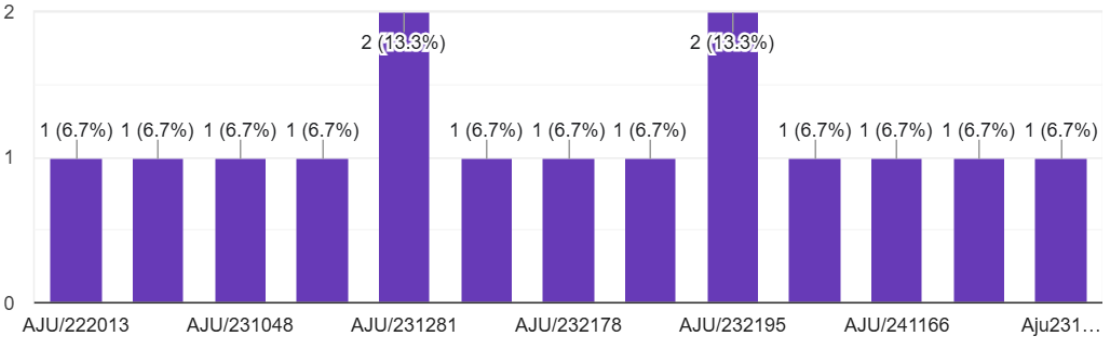

Speaker : Dr. Sudipta Som

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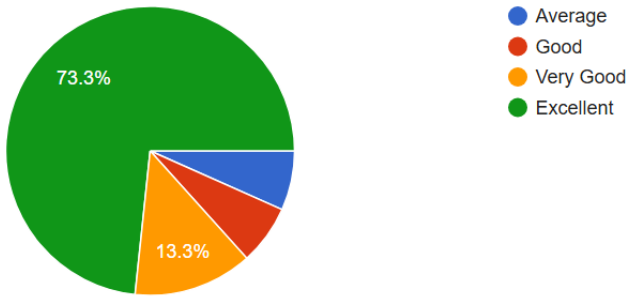
15 responses



Suggestion and over all feedback

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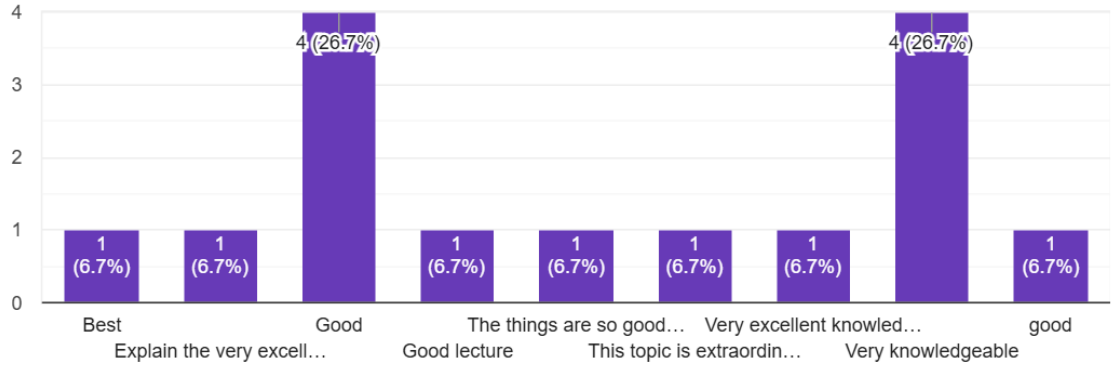
15 responses



Certificate: