Report of 6-days online ATAL FDP on Next Wave: Advancements in Next Generation Communications (Application no.: 1748541082, FDP ID - 4972)

Organized by the Department of ECE

Coordinator: Dr. Pradipta Maiti, Assistant Professor, ECE, Dr. Sudhir Chandra Sur Institute of Technology and Sports Complex, Kolkata
Co-coordinator: Mrs. Debasmita Manna, Assistant Professor, ECE, Dr. Sudhir Chandra Sur Institute of Technology and Sports Complex, Kolkata
Computer Operator: Ms. Sayani Roy, technical Assistant, CSE, Dr. Sudhir Chandra Sur Institute of Technology and Sports Complex, Kolkata

Date and venue: 25/08/2025-30/08/2025 (6 days), ECE department, Dr. Sudhir Chandra Sur Institute of Technology and Sports Complex, Kolkata (Online)

Link of the entire event:
https://youtube.com/playlist?list=PL6q1vBIjrW2l1WnsspWHRnZl1uuJcu-0T&si=H3LfdCwWxN1bBFN1
No. of Participants: 145
Chief Guest: Prof.(Dr.) Neeraj Saxsena, Pro Chancellor, JIS University
Inauguration (25/08/2025, 6:00pm-6:30pm):
Welcome Address by Coordinator: Dr Pradipta Maiti, Asst. Prof., ECE, SurTech
Welcome Address by the program Chair and Institute Head: Dr Saradindu Panda, Principal, SurTech
Keynote Speaker: Dr Neeraj Saxsena (Chief Guest), Pro Chancellor, JIS University

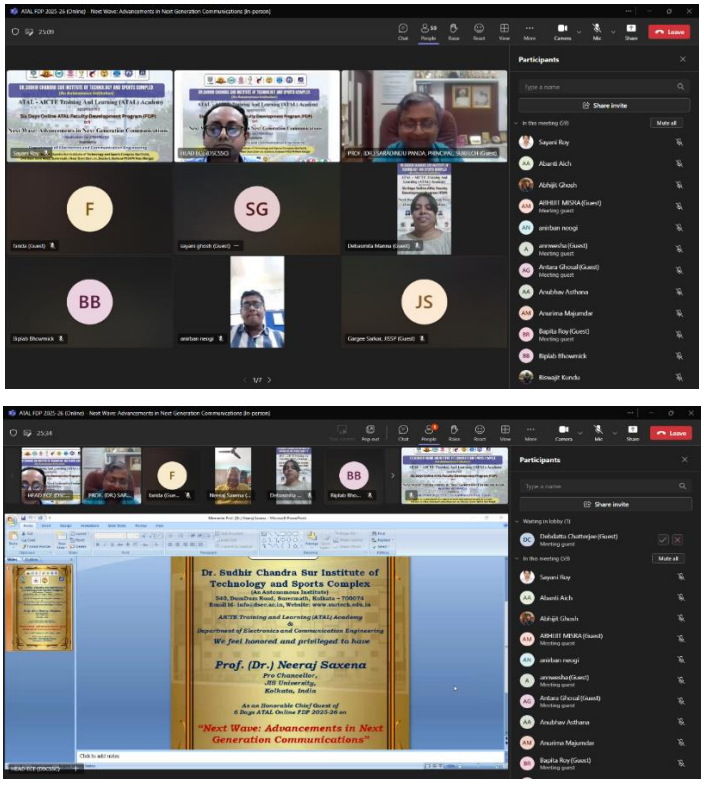

Fig.1 Few glimpses of inauguration session

Session-1(25/08/2025, 6:30PM-8:00PM):
Topic: Introduction to the Next Generation Communication: 5G
Name of the Expert: Prof. Debjani Mitra
Designation & Organization: Professor, Department of Electronics Engineering, IIT(ISM) Dhanbad.
Total Years of Experience: 33

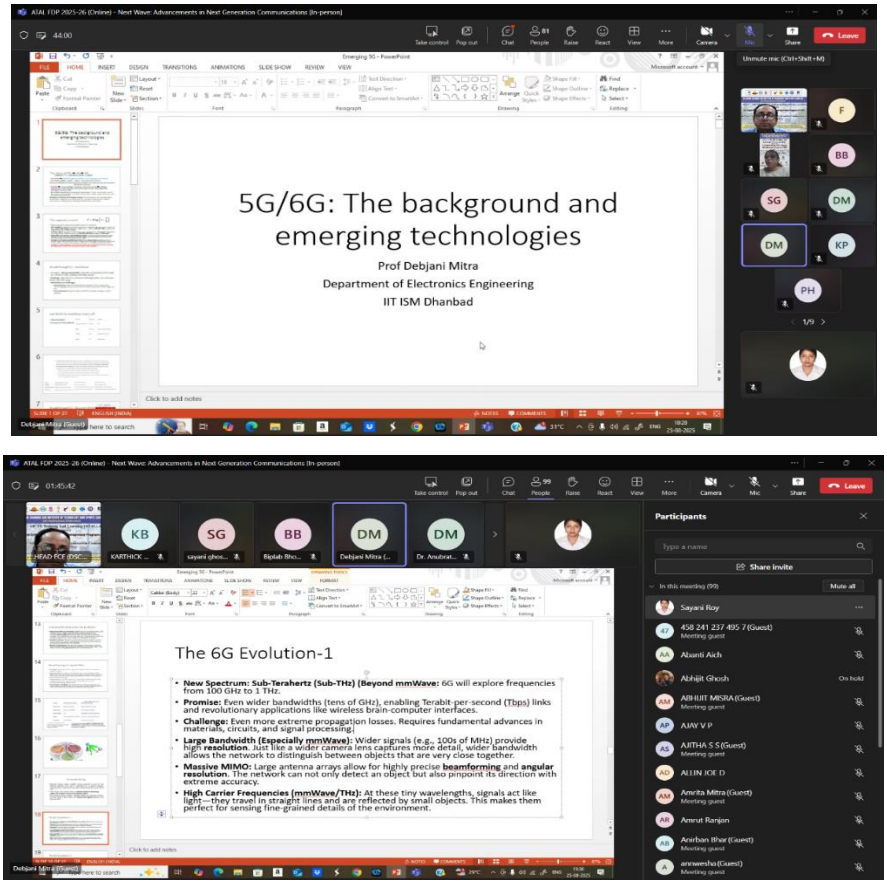

Fig.2 Few glimpses of session-1

Outcomes: Session-1 of the AICTE-ATAL FDP on *"Next Wave: Advancements in Next Generation Communications"* featured an insightful lecture on "Introduction to the Next Generation Communication: 5G*"* by Dr. Debjani Mitra, Professor, IIT(ISM) Dhanbad, with over 33 years of rich professional experiences.

Dr. Mitra demonstrated about the emerging technologies 5G and 6G. She discussed about the history of evaluation of new dense communication networks using beamforming, dense network, sub-6GHz or micro layer, small scale layer in mmWave. Also, she discussed about MIMO, massive MIMO and XL-MIMO communications, advantages of beamforming or spatial filtering techniques in mmWave – how it overcomes the problems of pathloss, enables tracking and reduce interference. Further, she discussed about network slicing. In 6G evaluation, she discussed about the XL-MIMO communication, Holographic communication reconfigurable intelligent surface, deep integration of AI/ML beam management, channel estimation, RIS optimization, joint sensing and communication.

The lecture was highly interactive, with participants engaging in discussions on real-world use cases and implementation challenges. Overall, the session provided participants with valuable technical knowledge and broadened their perspective on 5G and 6G future scopes in wireless communication.

Session-2(25/08/2025, 8:00PM-9:30PM):
Topic: Enabling Technologies for 6G communication.
Name of the Expert: Dr. Seemanti Saha
Designation & Organization: Associate Professor, Department of Electronics and Communication Engineering, NIT Patna.
Years of Experience: 22

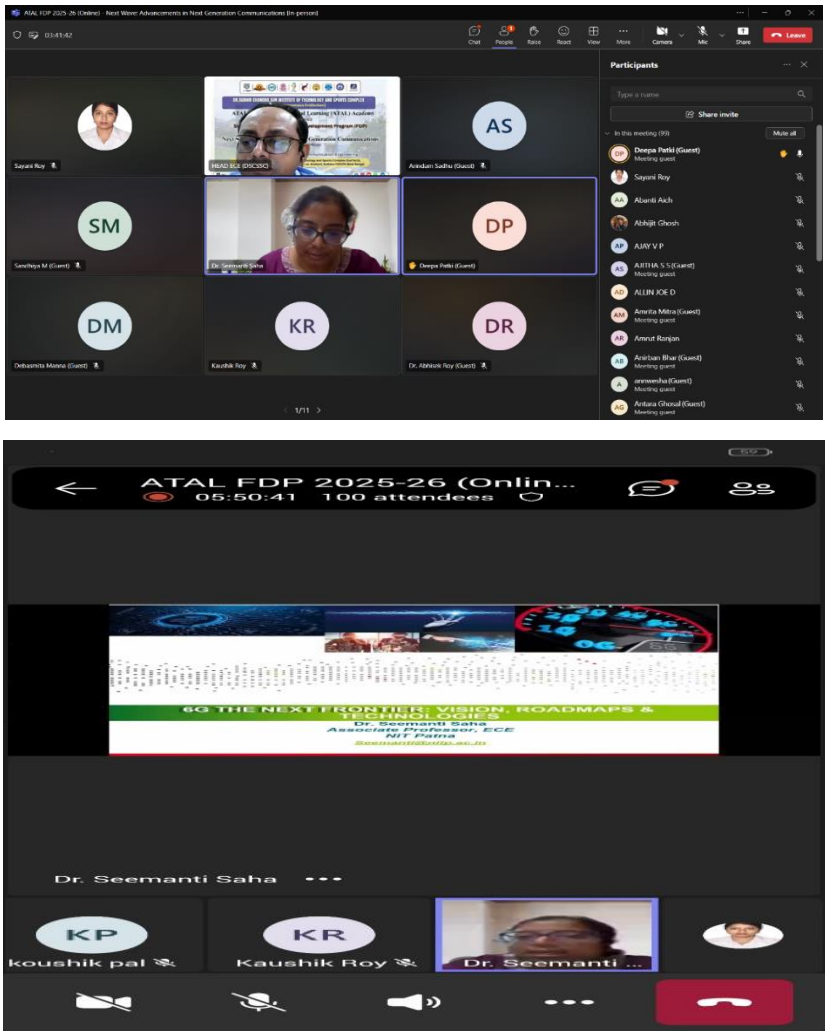

Fig.3 Few glimpses of session-2

Outcome: Session-2 of the AICTE-ATAL FDP on *"Next Wave: Advancements in Next Generation Communications"* featured an insightful lecture on *"*Enabling Technologies for 6G communication*"* by Dr. Seemanti Saha, Associate Professor, NIT Patna, with over 22 years of rich professional experiences.

Dr. Saha has discussed about the vision, roadmaps and technologies inside 6G communication. She discussed about the evaluation of wireless communication, sustainability issues for beyond 5G communications, need for 6G communication and its convergence, ICT infrastructure in 6G communication, THz communication. Also, she discussed about the integration of technologies, like – intelligence, massive MTC, super immersive, super precision, super URLLC, Super eMBB in 6G communication, 6G-V2X communication, She compared various parameters of 5G and 6G communications, massive power requirements in data communication,

integration of AI in 6G, holographic projection, architecture for 6G communication, memory computing, enabling wireless technology for edge training and mega trends of 6G communication.

The lecture was highly interactive, with participants engaging in discussions on real-world use cases and implementation challenges. Overall, the session provided participants with valuable technical knowledge and broadened their perspective on 6G communication as future scopes in wireless communication.

Session-3 (26/08/2025, 6:00PM to 7:30PM):
Topic: Fundamentals of Physical Layers Technology for 5G and 6G Communications.
Name of the Expert: Dr. Himanshu Bhusan Mishra
Designation & Organization Associate Professor, Department of Electronics Engineering, IIT(ISM) Dhanbad.
Years of Experience: 14

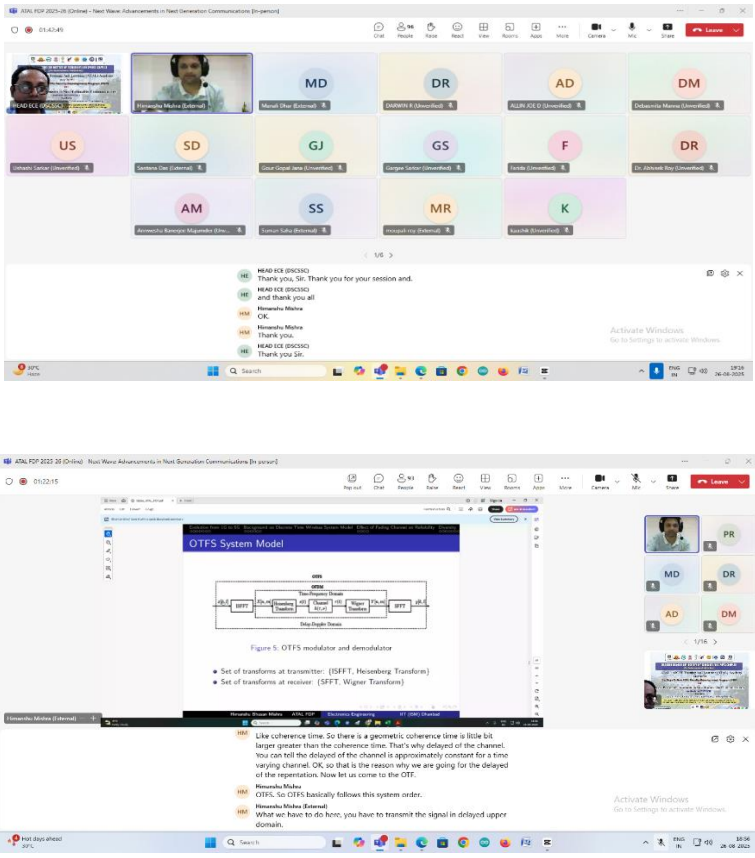

Fig.4 Few glimpses of session-3

Outcome: Session-3 of the AICTE-ATAL FDP on *"Next Wave: Advancements in Next Generation Communications"* featured an insightful lecture on "Fundamentals of Physical Layers Technology for 5G and 6G Communications" by Dr. Himanshu Bhusan Mishra, Associate Professor, IIT(ISM) Dhanbad, with over 14 years of rich professional experiences.

Dr. Mishra has discussed about the fundamentals of Physical layer technologies from 3G to 6G communications, MIMO, Massive MIMO, OFDM, in 5G and OTFS, ISAC and RIS in 6G communication fast fading, Rayleigh fading channel, diversity, SIMO, MISO, MIMO, MU-MIMO, OFDM system, wireless channel in delay-doppler domain, OTFS system model.

The lecture was highly interactive, with participants engaging in discussions on real-world use cases and implementation challenges. Overall, the session provided participants with valuable technical knowledge and broadened their perspective on the physical layers technologies for 3G and 6G communication as future scopes in wireless communication.

Session-4 (26/08/2025, 7:30PM to 9:00PM):

Topic: Wireless Power Transfer in Advance Communication Systems
Name of the Expert: Dr. Md. Nazmul Alam
Designation & Organization: Principal Magnetics Engineer, NuCurrent, Chicago, USA
Years of Experience: 15

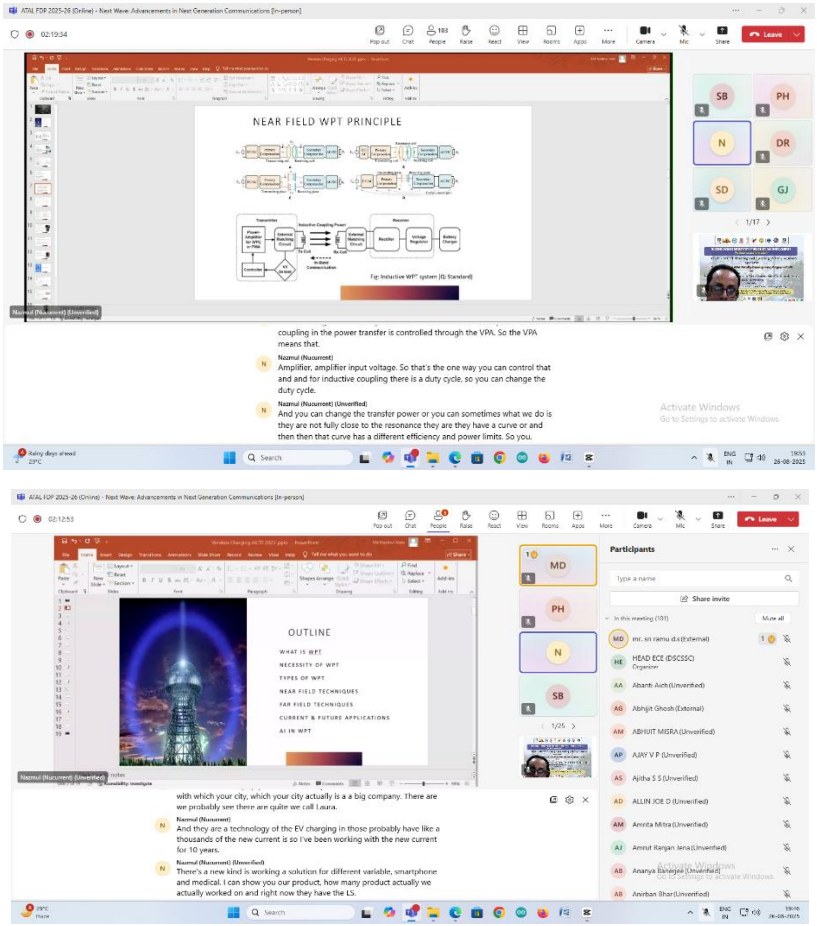

Fig.5 Few glimpses of session-4

Outcome: Session-4 of the AICTE-ATAL FDP on *"Next Wave: Advancements in Next Generation Communications"* featured an insightful lecture on *"*Wireless Power Transfer in Advance Communication Systems*"* by Dr. Md. Nazmul Alam, Principal Magnetics Engineer, NuCurrent, Chicago, USA, with over 15 years of rich professional experiences.

Dr. Alam has discussed about the wireless power transfer, near field principal and techniques, far field principal and techniques, AI in wireless power transfer for future communication world. He discussed about future products for medical implementation, advantage of using AI in wireless power technology.

The lecture was highly interactive, with participants engaging in discussions on real-world use cases and implementation challenges. Overall, the session provided participants with valuable technical knowledge and broadened their perspective on wireless power transfer as future scopes in wireless communication.

Session-5(26/08/2025, 6:00PM to 7:30PM)

Topic: Next Generation Vehicular Communication
Name of the Expert: Dr. Banoth Ravi
Designation & Organization: Assistant Professor, Department of ECE, IIIT Trichy
Years of Experience: 17

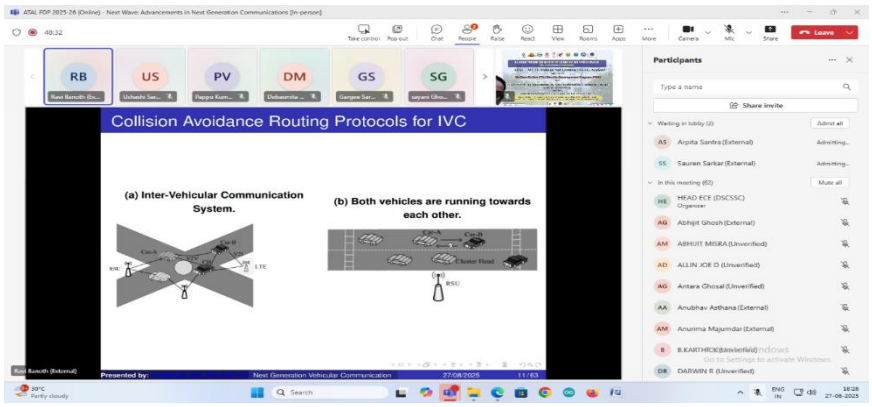

Fig.6 Few glimpses of session-5

Outcome: Session-5 of the AICTE-ATAL FDP on *"Next Wave: Advancements in Next Generation Communications"* featured an insightful lecture on *"*Next Generation Vehicular Communication*"* by Dr. Banoth Ravi, Principal Magnetics Engineer, Assistant Professor, Department of ECE, IIIT Trichy, with over 17 years of rich professional experiences.

Dr. Ravi has discussed about the Next Generation Vehicular Communication. He discussed about VANET, Multi service provisioning of QoS for SDVN, SDHVN, Stochastic process, Queueing theory, markov chain. He shows the system performance of vehicular communication system.

The lecture was highly interactive, with participants engaging in discussions on real-world use cases and implementation challenges. Overall, the session provided participants with valuable technical knowledge and broadened their perspective on Next Generation Vehicular Communication as future scopes in wireless communication.

Session-6 (27/08/2025, 7:30PM to 9:00PM):

Topic: AI in Modern Communication
Name of the Expert: Mr. Ranajoy Ghosh
Designation & Organization: Director - Program and Project Management, LTI Mindtree, Kolkata
Years of Experience: 20

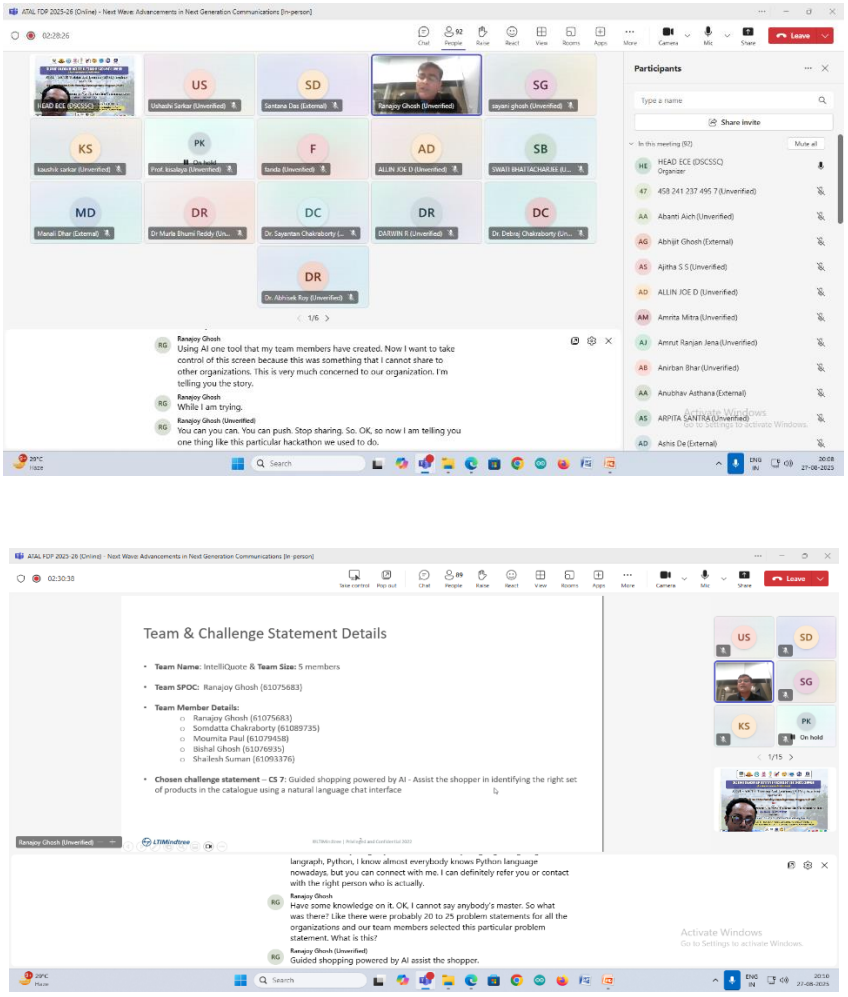

Fig.7 Few glimpses of session-6

Outcome: Session-6 of the AICTE-ATAL FDP on *"Next Wave: Advancements in Next Generation Communications"* featured an insightful lecture on *"*AI in Modern Communication*"* by Mr. Ranajoy Ghosh, Director - Program and Project Management, LTI Mindtree, Kolkata, with over 20 years of rich professional experiences.

Mr. Ranajoy Ghosh has discussed about the implementation of AI in modern communication. He has discussed about agentic AI, advanced real-time communication, AI in enterprise communication, AI in telecom and broadcasting, multimodal and conversational AI, agentic AI.

The lecture was highly interactive, with participants engaging in discussions on real-world use cases and implementation challenges. Overall, the session provided participants with valuable technical knowledge and broadened their perspective on AI in Modern Communication as future scopes in wireless communication.

Session 7 (28/08/2025, 6:00PM to 7:30PM):

Topic: Software Defined Radio in Advance Wireless Communication
Name of the Expert: Mr. Joydeep Nath
Designation & Organization: Senior Consultant, Engineering & Academic, Logarhythm Consultancy Pvt. Ltd., Kolkata
Years of Experience: 30

Outcome: Session 7 of the AICTE-ATAL FDP on *"Next Wave: Advancements in Next Generation Communications"* featured an insightful lecture on *"Software Defined Radio in Advanced Wireless Communication"* by **Mr. Joydeep Nath**, Senior Consultant, Engineering & Academic, Logarhythm Consultancy Pvt. Ltd., Kolkata, with over 30 years of rich professional experience.

Mr. Nath elaborated on the evolution of wireless communication systems and the pivotal role of **Software Defined Radio (SDR)** in modern networks. He explained how SDR enables flexibility, scalability, and cost-effectiveness by replacing conventional hardware with software-driven functionalities. The session highlighted SDR's applications in next-generation technologies such as 5G, cognitive radio, and IoT, emphasizing its potential to revolutionize communication research and industry practices.

The lecture was highly interactive, with participants engaging in discussions on real-world use cases and implementation challenges. Overall, the session provided participants with valuable technical knowledge and broadened their perspective on SDR's future scope in wireless communication.

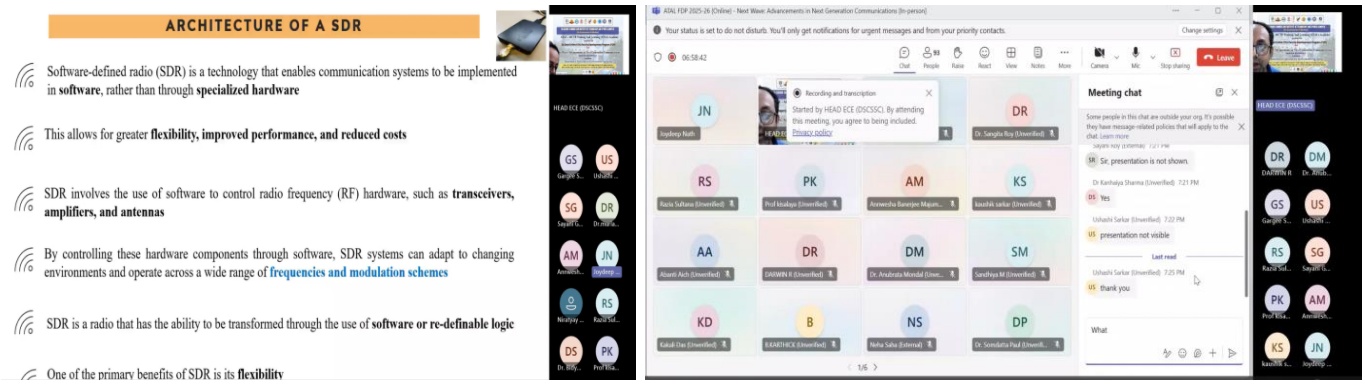

Fig.8 Image ATAL- FDP Session7: Day-4 (28th August, 2025)

Session 8 (28/08/2025, 7:30PM to 9:00PM)

Topic: 5G and Beyond: Transforming Industry
Name of the Expert: Mr. Sourbh Kumar
Designation & Organization: Founder and CEO Livid Design Inc. (Robotics and AI Application based Company- Ed Tech and Consumer Products), Livid Design Inc, Kolkata
Years of Experience: 11

Outcome: Session-8 of the Faculty Development Programme (FDP) focused on the topic *"5G and Beyond: Transforming Industry"*. The session was delivered by **Mr. Sourbh Kumar**, Founder and CEO of **Livid Design Inc.**, a Kolkata-based company specializing in Robotics and AI applications in EdTech and consumer products. With **11 years of experience**, Mr. Kumar provided an engaging and futuristic perspective on how 5G technology is revolutionizing various industries. He discussed the key features of 5G—ultra-low latency, high-speed connectivity, and massive device connectivity—and how these are enabling advancements in

automation, smart manufacturing, healthcare, education, and more. He also touched upon future trends such as 6G, AI integration, and the role of edge computing. The session was highly interactive, with real-world examples and live case studies, making it insightful and practical. Participants gained a clear understanding of how 5G and beyond will reshape industrial operations and open new possibilities across sectors.

Fig.9 Image ATAL- FDP Session 8: Day-4 (28th August, 2025)

Session 9 (29/08/2025, 6:00PM to 7:30PM)

Topic: Introduction to AI in Next Generation Communication
Name of the Expert:
Mr. Abhijan Bhattacharya
Designation & Organization:
Scientist, Innovation Lab, TCS, Kolkata
Years of Experience: 25

Outcome: Session 9 of the Faculty Development Program (FDP) was held on the topic *"Introduction to AI in Next Generation Communication"*. The session was conducted by **Mr. Abhijan Bhattacharya**, Scientist at the Innovation Lab, TCS, Kolkata, who brings **25 years of experience** in research and innovation. Mr. Bhattacharya introduced the fundamentals of Artificial Intelligence (AI) and its growing relevance in next-generation communication systems. He explained how AI is enabling smarter, faster, and more efficient communication networks through applications such as intelligent routing, network optimization, fault detection, and user behavior analysis. The session also highlighted the role of machine learning algorithms in handling massive data traffic in 5G and beyond. Mr. Bhattacharya shared real-world use cases and ongoing developments in the telecom industry. The lecture was insightful and well-received, providing participants with a strong foundation on how AI is shaping the future of communication technologies.

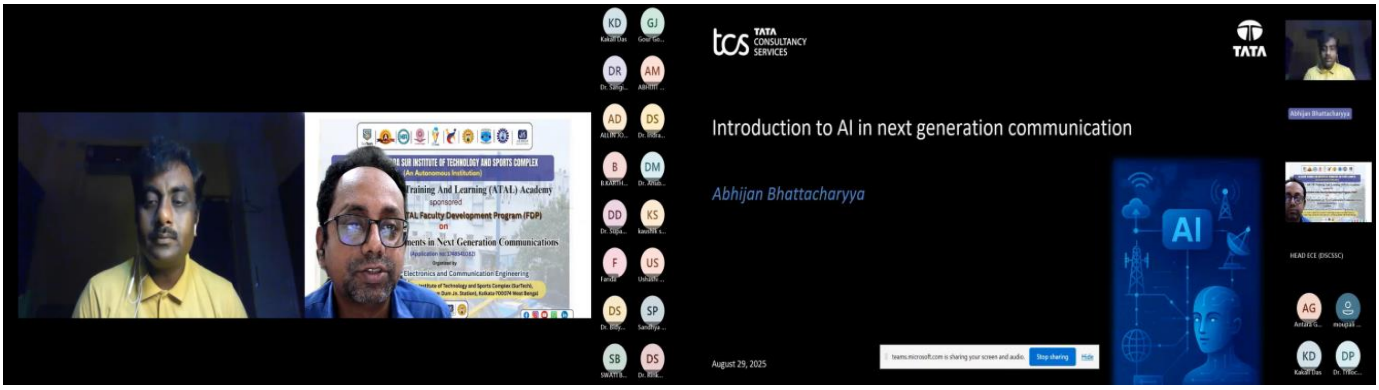

Fig.10 Image ATAL- FDP Session 9: Day-5 (29th August, 2025)

Session 10 (29/08/2025, 7:30PM to 9:00PM)

Topic: Implementation of AI in Next Generation Communication
Name of the Expert: Prof. Babu Sena Paul
Designation & Organization: Associate Professor and Director, Institute of Intelligent Systems, University of Johannesburg, South Africa
Years of Experience: 27

Outcome: Session-10 of the Faculty Development Programme (FDP) was conducted from **7:30 PM to 9:00 PM** on the topic *"Implementation of AI in Next Generation Communication"*. The session was delivered by **Prof. Babu Sena Paul**, Associate Professor and Director of the Institute of Intelligent Systems, University of Johannesburg, South Africa. With **27 years of experience**, Prof. Paul provided deep insights into how Artificial Intelligence (AI) is revolutionizing modern communication systems. He discussed the integration of AI in areas such as network optimization, predictive maintenance, intelligent resource allocation, and real-time decision-making in 5G and future networks. The session also covered emerging trends like AI-driven edge computing and autonomous network management. Prof. Paul emphasized the role of machine learning and deep learning in enhancing communication efficiency and user experience. The lecture was highly informative, engaging, and sparked meaningful discussions, offering participants a clear understanding of AI's transformative potential in next-generation communication.

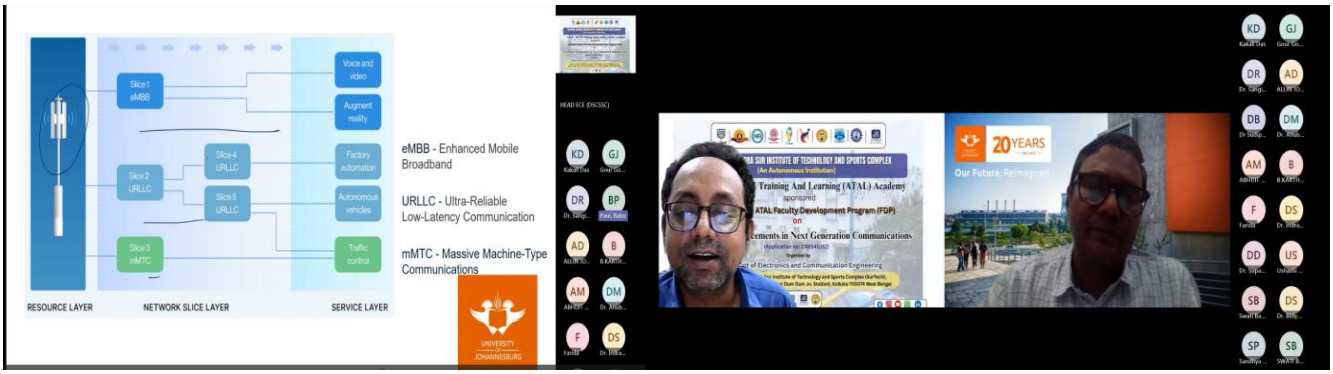

Fig.11 Image ATAL- FDP Session 10: Day-5 (29th August, 2025)

Session 11 (30/08/2025, 2:00PM to 3:30PM)
Topic: MIMO Antenna Design for Next Generation Communication.
Name of the Expert: Dr. Ankit Bhattacharjee
Designation & Organization: Technical Lead, Engineering and R & D Services, HCL Tech
Years of Experience: 10

Outcome: Session 11 of the Faculty Development Programme (FDP) was centered on the topic *"MIMO Antenna Design for Next Generation Communication"*. The expert speaker, **Dr. Ankit Bhattacharjee**, Technical Lead at Engineering and R&D Services, HCL Technologies, brought **10 years of industry and research experience** to the session. Dr. Bhattacharjee provided a comprehensive overview of Multiple Input Multiple Output (MIMO) antenna technology, emphasizing its critical role in enhancing data rates, capacity, and reliability for next-generation wireless communication systems, including 5G and beyond. He discussed various design techniques, challenges in real-world implementation, and the impact of MIMO systems on modern communication infrastructure. The session also highlighted recent advancements and trends in

antenna miniaturization and integration. Participants appreciated the practical insights and real-world applications shared during the lecture, making it both informative and highly relevant. The session significantly contributed to the participants' understanding of advanced communication technologies.

Fig.12 Image ATAL- FDP Session 11: Day-6 (30th August, 2025)

Session 12 (30/08/2025, 3:30PM to 5:00PM)
Topic: Quantum Communication
Name of the Expert: Dr. Amit Kumar Dutta
Designation & Organization: Associate Professor. G.S Sanyal School of Telecommunication, IIT Kharagpur
Years of Experience: 26

Outcome: Session 12 of the Faculty Development Programme (FDP) focused on the topic *"Quantum Communication"* and was delivered by **Dr. Amit Kumar Dutta**, Associate Professor at the G.S. Sanyal School of Telecommunication, IIT Kharagpur. With **26 years of experience** in the field, Dr. Dutta provided an in-depth overview of the principles and applications of quantum communication. He discussed key concepts such as quantum entanglement, quantum key distribution (QKD), and the potential of quantum networks in ensuring ultra-secure data transmission. The session also explored the current challenges and future prospects of implementing quantum communication technologies in real-world systems. Dr. Dutta highlighted ongoing research and developments in India and abroad, offering valuable insights into the global landscape. The lecture was highly informative and intellectually stimulating, enriching the participants' understanding of this cutting-edge domain. It inspired academic curiosity and opened avenues for future research and collaboration in quantum technologies.

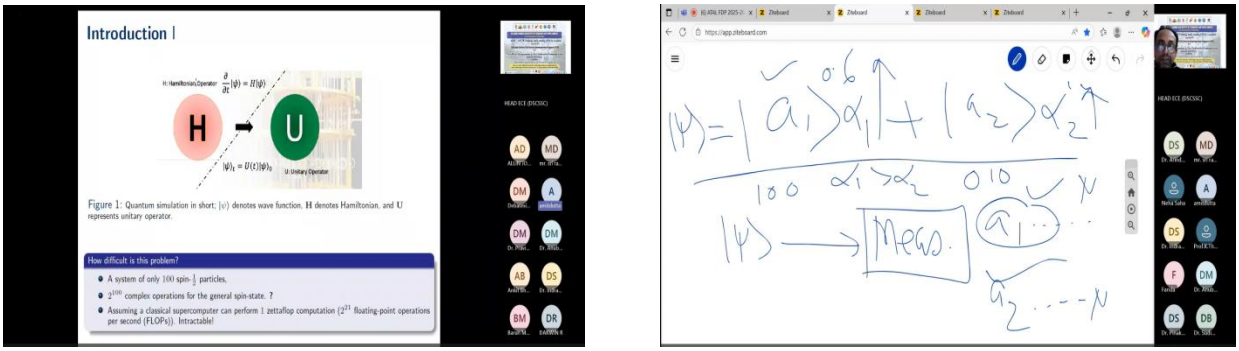

Fig.13 Image ATAL- FDP Session 12: Day-6 (30th August, 2025)

Session 13 (30/08/2025, 5:00PM to 6:30PM)

Topic: Internet of Medical Things
Name of the Expert: Dr. Anjan Kumar Kundu
Designation & Organization: Associate Professor, Department of Radio Physics and Electronics, University of Calcutta.
Years of Experience: 27

Outcome: Session 13 of the Faculty Development Programme (FDP) was held on the topic *"Internet of Medical Things (IoMT)"*, delivered by **Dr. Anjan Kumar Kundu**, Associate Professor, Department of Radio Physics and Electronics, University of Calcutta. With **27 years of academic and research experience**, Dr. Kundu shared in-depth knowledge on the convergence of healthcare and IoT technologies. He explained how IoMT enables real-time patient monitoring, remote diagnostics, and personalized treatment through interconnected medical devices. The session also covered the architecture of IoMT systems, data security challenges, and the role of AI and big data in improving healthcare outcomes. Dr. Kundu highlighted several case studies and current research trends, making the session both informative and engaging. Participants gained valuable insights into how IoMT is transforming healthcare infrastructure and service delivery. The lecture was well-received and contributed significantly to the understanding of emerging technologies in the medical domain.

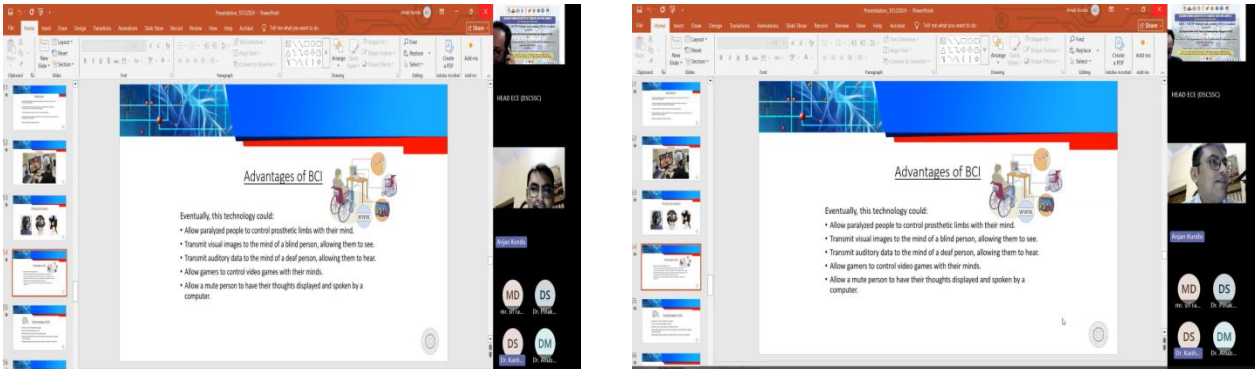

Fig.14 Image ATAL- FDP Session 13: Day-6 (30th August, 2025)

Outcome: The Six-Day Online AICTE-ATAL Faculty Development Programme on *"Next Wave: Advancements in Next Generation Communications"* organized by the Department of Electronics and Communication Engineering, SurTech, concluded successfully on 30th August 2025. The FDP witnessed enthusiastic participation from academicians, researchers, and industry professionals across India. Through thirteen technical sessions delivered by eminent experts from IITs, NITs, international universities, and industry leaders, the program enriched participants with comprehensive insights into 5G, 6G, AI, ML, IoT, quantum communication, vehicular communication, and emerging technologies.

Assessment Test (30/08/2025, 6:30PM to 7:30PM):

On the final day, participants undertook an **assessment test** to evaluate their learning outcomes. The test served as an effective tool to measure knowledge acquisition and conceptual clarity. This was followed by the **feedback session**, where participants shared their valuable reflections. The feedback highlighted that the sessions were highly informative, well-structured, and engaging, with a balanced blend of theoretical concepts and practical applications. Many participants appreciated the diverse expertise of the speakers and expressed that the program significantly enhanced their research perspectives and pedagogical skills.

Valedictory (30/08/2025, 7:30PM to 8:00PM):

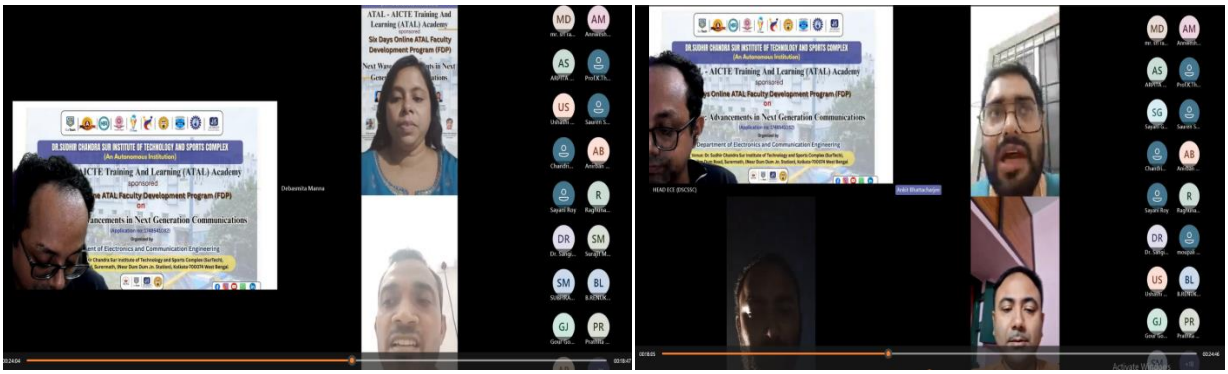

Image ATAL- FDP Valedictory Session: Day-6 (30th August, 2025)

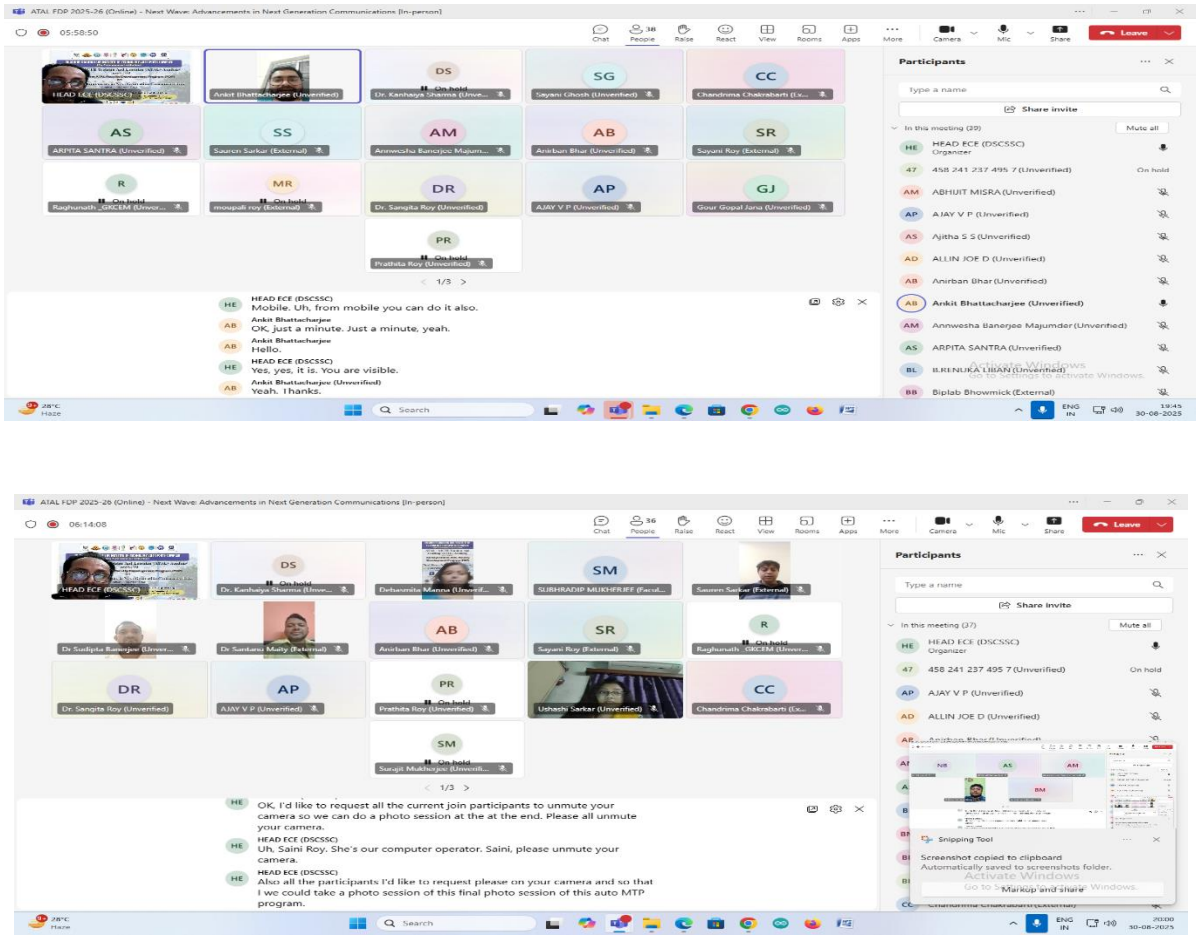

Fig.15 Few glimpses of valedictory session

Outcome: The **valedictory session** was marked by the presence of distinguished dignitaries, organizers, and participants. Participants who fulfilled the required criteria of attendance and test performance received the

Certificates from ATAL Portal. The session concluded with expressions of gratitude towards AICTE-ATAL Academy, SurTech management, resource persons, and participants and the organizing committee for their collective effort in making the FDP a resounding success. The program not only fulfilled its objectives but also paved the way for future collaborations and innovations in next-generation communication technologies.