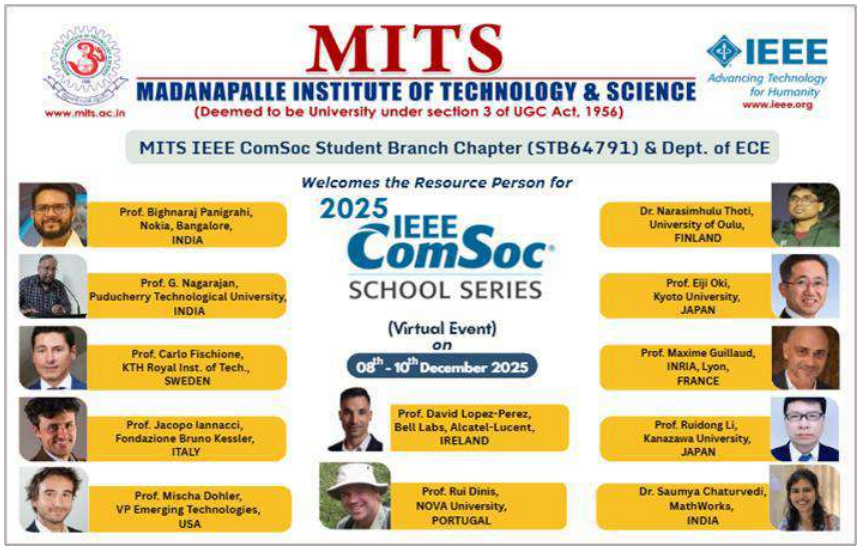
A Report on
Three-Day 2025 IEEE ComSoc School Series Event on "Advances in Wireless Connectivity: Technologies, Systems, and Network Evolution"
Organized by MITS IEEE ComSoc Student Chapter & Department of Electronics and Communication Engineering
In Sponsorship with IEEE Communications Society (ComSoc)
from 08.12.2025 to 10.12.2025

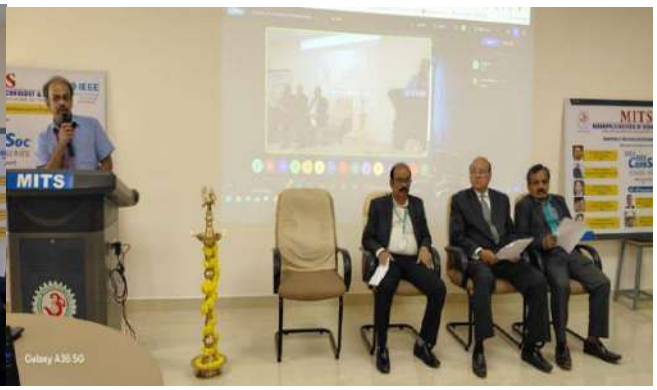


Report Submitted by: Dr. E. Aravindraj, Assistant Professor, Department of ECE
Event Coordinators: Dr. E. Aravindraj, Assistant Professor, Department of ECE; Dr. Gutti Nagaswetha Assistant Professor, Department of ECE
Event Co-Coordinators: Dr. G. Subbarao, Assistant Professor, Department of ECE & Mr. T. Manivannan, Assistant Professor, Department of ECE
Resource Person details:

1. **Prof. Bighnaraj Panigrahi, Nokia, Bangalore, INDIA**
2. **Prof. G. Nagarajan, Puducherry Technological University, INDIA**
3. **Prof. Carlo Fischione, KTH Royal Inst. of Tech., Stockholm, SWEDEN**
4. **Prof. Jacopo Iannacci, Fondazione Bruno Kessler, Trento, ITALY**
5. **Prof. Mischa Dohler, VP Emerging Technologies, California, USA**
6. **Dr. Saumya Chaturvedi, MathWorks, INDIA**
7. **Prof. David Lopez-Perez, Bell Labs, Alcatel-Lucent, Dublin, IRELAND**
8. **Prof. Rui Dinis, NOVA University,Lisbon, PORTUGAL**
9. **Dr. Narasimhulu Thoti, University of Oulu, FINLAND**
10. **Prof. Eiji Oki Kyoto University, JAPAN**
11. **Prof. Maxime Guillaud INRIA, Lyon, FRANCE**
12. **Prof. Ruidong Li, University of Tsukuba, JAPAN**

Participants: 170 IEEE Student Members (125-Indian Participants) & (45-International Participants)
Mode of Conduct: Hybrid (Scaleup Classroom, MITS (Offline) & SpatialChat (Online))
Report Received on 01.01.2026.

The MITS IEEE ComSoc Student Branch and the Department of ECE at Madanapalle Institute of Technology & Science (MITS), Deemed to be University, are organized the global event "2025 IEEE ComSoc School Series Andhra Pradesh (Virtual)" on the theme "Advances in Wireless Connectivity: Technologies, Systems, and Network Evolution" from 08th to 10th December 2025.



Inaugural Ceremony: December 08th, 2025:

The Inaugural Ceremony of the 2025 IEEE ComSoc School Series Event was successfully conducted on 08th December 2025 (Monday) from 09:30 AM to 10:00 AM in a hybrid mode, with online participation through the SpatialChat platform and offline gathering at the Scale-Up Classroom, Lakshmi Block, MITS Deemed to be University.

The program commenced with a Prayer Song, gracefully rendered by Ms. Pallavi, 1st Year M.Tech (CSE) student, and Lighting of the Lamp symbolizing the auspicious beginning of the global academic event. The Welcome Address was delivered by Dr. E. Aravindraj, Assistant Professor, Department of ECE, who warmly welcomed the dignitaries, speakers, participants, and organizers, and briefly outlined the objectives and global significance of the IEEE ComSoc School Series.

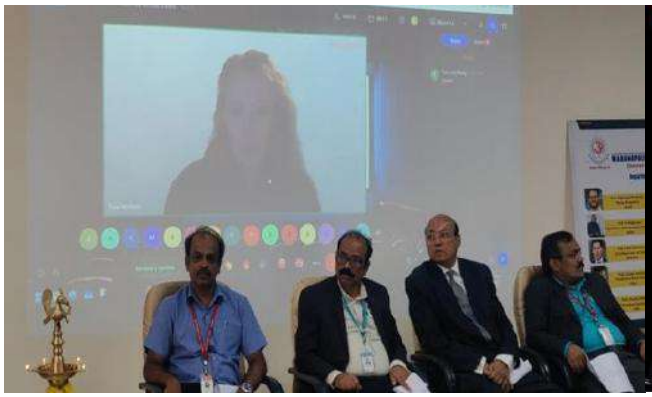
The Inaugural Address was given by Dr. S. Rajasekaran, Professor and Head of the Department of ECE, who highlighted the importance of emerging wireless technologies and the role of academia in shaping future communication systems.

This was followed by an Address by Dr. Sremmant Basu, Professor and Dean – Administration, International Relations & UGC Affairs, who emphasized international collaboration, research-driven learning, and the relevance of IEEE platforms in global knowledge exchange.

The Presidential Address was delivered by Dr. C. Yuvaraj, Hon'ble Vice-Chancellor of MITS Deemed to be University, who officially inaugurated the event and appreciated the efforts of the organizing team in hosting a prestigious global IEEE program.

He highlighted that the event received an overwhelming global response, with over 170+ IEEE ComSoc student members registered, including 40+ international participants from Argentina, Bangladesh, Bolivia, Brazil, Canada, Colombia, Ecuador, Egypt, Greece, Hong Kong, Indonesia, Italy, Kenya, the Republic of Korea, Kuwait, Mexico, Morocco, Pakistan, Peru, Portugal, Rwanda, Spain, Switzerland, Tunisia, Uruguay, and the USA.

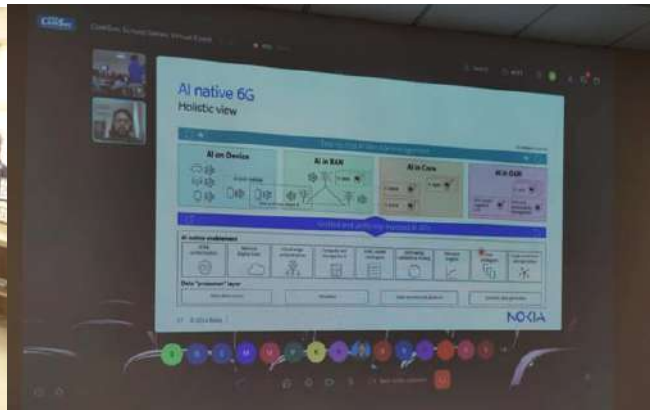
An overview About IEEE Communications Society (ComSoc) was presented by Ms. Saida Habeebunnisa Shaik, 1st Year M.Tech (ECE) student, introducing participants to the mission and global impact of IEEE ComSoc.




The ceremony was further enriched by Special Addresses from IEEE ComSoc leadership, delivered by Ms. Tara McNally, Senior Program Manager, IEEE ComSoc Educational Services Board, USA, and Prof. Venkatesha Prasad (VP), Director – Member Services, IEEE ComSoc Educational Services Board. Both speakers highlighted the objectives of the School Series,

encouraged active student participation, and appreciated MITS Deemed to be University for successfully organizing a global knowledge-sharing platform.

The inaugural session concluded with Closing Remarks, marking the formal commencement of the three-day technical program featuring distinguished lecturers from across the globe.



Following the inaugural session, the event commenced with its first technical session delivered by Prof. Bighnaraj Panigrahi from Nokia, who provided expert insights into cutting-edge developments in wireless systems and network evolution.

Day 1: December 08th, 2025 (Session 1 - 10:00 to 11:00 _ IST)	
Resource Person:	**Prof. Bighnaraj Panigrahi, Nokia, Bangalore, INDIA**
Topic:	**AI-native 6G**

During the lecture, the speaker provided an in-depth overview of the role of artificial intelligence as a native component in future 6G networks, highlighting how AI is being embedded across network architecture, radio access, and core network intelligence. The session was enriched with multiple real-time industrial use cases and practical examples from Nokia, showcasing ongoing research and development efforts in 6G and AI-driven network automation.

Prof. Panigrahi also discussed emerging challenges, performance requirements, and the transition from traditional optimization techniques to AI-native design paradigms, offering valuable insights into how industry and academia can collaborate in shaping next-generation wireless systems. The session concluded with an interactive Q&A, where participants actively engaged with the speaker and received clear, practical responses to their queries.

Day 1: December 08th, 2025 (Session 2 - 11:30 to 12:30 _ IST)	
Resource Person:	**Prof. G. Nagarajan, Puducherry Technological University, INDIA**
Topic:	**An Insight into Advanced Wireless Communications and Networks in the 5G/6G Era**

In this engaging lecture, Prof. Nagarajan provided a comprehensive overview of the evolution of wireless communication systems, bridging foundational concepts with emerging 5G and 6G technologies. The session stood out for its philosophical approach, where the speaker skillfully used thought-provoking quotes, analogies, and real-life reflections to explain complex technical ideas, making the content both insightful and highly relatable.

These philosophical examples not only enhanced conceptual understanding but also encouraged participants to think beyond conventional technical boundaries. The interactive discussion and reflective insights made the lecture intellectually stimulating and memorable, leaving a lasting impression on the participants.

Day 1: December 08th, 2025 (Session 3 - 14:00 to 15:00 _ IST)	
Resource Person:	**Prof. Carlo Fischione, KTH Royal Inst. of Tech., Stockholm, SWEDEN**
Topic:	**AI at the Wireless Edge: From Distributed Learning to Over-the-Air Model Aggregation**

Prof. Fischione presented an in-depth and forward-looking perspective on the integration of artificial intelligence at the wireless edge, emphasizing distributed learning frameworks and over-the-air model aggregation techniques. The lecture highlighted how edge intelligence can significantly improve scalability, latency, and energy efficiency in next-generation wireless networks.

The speaker effectively connected theoretical foundations with practical system considerations, providing clear insights into ongoing research challenges and future directions in edge AI–enabled wireless communications. The session was highly informative and interactive, stimulating thoughtful discussions among participants on the role of AI-driven intelligence in upcoming 5G-Advanced and 6G networks.

Day 1: December 08th, 2025 (Session 4 - 15:30 to 16:30 _ IST)	
Resource Person:	**Prof. Jacopo Iannacci, Fondazione Bruno Kessler, Trento, ITALY**
Topic:	**Framing 6G and Future Networks (FN) in terms of Key Enabling Technologies (KET), Technology Trends (TT) and Key Performance Indicators (KPI)**

Prof. Iannacci provided a comprehensive and structured overview of 6G and future network ecosystems, framing them through the lenses of Key Enabling Technologies, emerging technology trends, and critical performance metrics. The lecture offered valuable insights into how evolving KPIs will shape the design, evaluation, and deployment of next-generation wireless systems.

The session effectively bridged research, standardization, and practical implementation aspects, enabling participants to better understand the roadmap toward 6G and beyond. The talk was well received for its clarity, depth, and relevance, fostering meaningful discussions on future challenges and opportunities in advanced wireless networks.

Day 2: December 09th, 2025 (Session 1 - 10:00 to 11:00 _ IST)	
Resource Person:	**Prof. Mischa Dohler, VP Emerging Technologies, California, USA**
Topic:	**Building an AI, AR & API Platform Economy on 5G – An Ericsson Silicon Valley View**

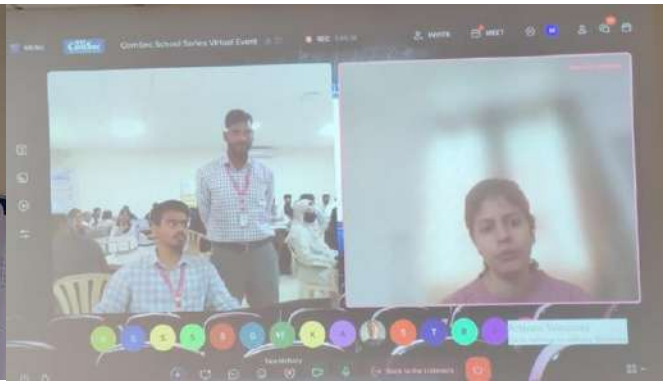
Prof. Dohler presented the topic from a Silicon Valley perspective, sharing current industry examples and real-world deployments drawn from Ericsson's innovation ecosystem. He elaborated on how 5G acts as a catalyst for AI-driven and AR-enabled platform economies, emphasizing the importance of open APIs, software-driven networks, and ecosystem-based innovation in shaping future digital services.

The session provided participants with valuable insights into practical implementation strategies, business models, and technology convergence shaping next-generation networks. Following the lecture, an interactive Q&A session was conducted, during which both online and offline participants actively engaged with the speaker, raising insightful questions and discussing emerging trends in 5G and beyond.

The session was highly informative and well-received, offering a balanced blend of industry vision, technological depth, and practical relevance.

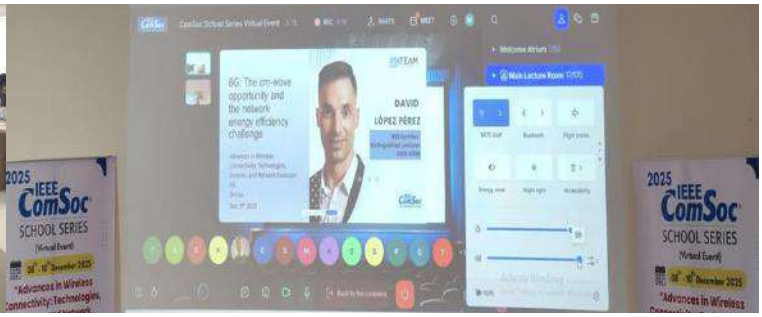
Day 2: December 09th, 2025 (Session 2 - 11:30 to 12:30 _ IST)	
Resource Person:	**Dr. Saumya Chaturvedi, MathWorks, INDIA**
Topic:	**Beyond the Ground: NTN Evolution from 5G to 6G**

Dr. Saumya Chaturvedi provided a comprehensive overview of Non-Terrestrial Networks (NTN) and their evolving role from 5G towards 6G ecosystems. The session highlighted the integration of satellite, aerial, and space-based communication systems with terrestrial networks to enable global connectivity.



The speaker enriched the lecture with real-time examples and demonstrations using MATLAB, illustrating satellite communication modeling, system-level simulations, and performance evaluation. She also discussed current and upcoming projects at MathWorks related to 5G and 6G research, emphasizing how MATLAB tools support algorithm development, system design, and validation for next-generation wireless networks.

The session offered valuable insights into practical NTN implementations, bridging theory with real-world applications, and was well received by participants for its industry relevance and hands-on perspective.



Day 2: December 09th, 2025 (Session 3 - 14:00 to 15:00 _ IST)	
Resource Person:	**Prof. David Lopez-Perez, Bell Labs, Alcatel-Lucent, Dublin, IRELAND**
Topic:	**6G: The cm-wave opportunity and the network energy efficiency challenge**

Prof. López-Pérez presented an in-depth analysis of the centimeter-wave (cm-wave) spectrum opportunities in the context of 6G wireless networks, emphasizing their potential to balance capacity enhancement and coverage expansion. The lecture highlighted critical challenges related to network energy efficiency, including power consumption, sustainable network design, and optimization strategies for future communication systems.

The speaker shared valuable insights drawn from Bell Labs' ongoing research and industrial perspectives, providing participants with a clear understanding of how cm-wave technologies can play a vital role in achieving high-performance yet energy-efficient 6G networks.

The session concluded with an interactive Q&A segment, during which both online and offline participants actively engaged with the speaker. Prof. López-Pérez addressed several thoughtful questions related to practical deployment challenges, energy-aware network architectures, and future research directions, making the session highly informative and engaging.

Day 2: December 09th, 2025 (Session 4 - 15:30 to 16:30 _ IST)	
Resource Person:	**Prof. Rui Dinis, NOVA University, Lisbon, PORTUGAL**
Topic:	**A Look Beyond Massive MIMO: Working with a Huge Number of Antennas for Reliable and Secure Communications**

Prof. Dinis provided an insightful overview of next-generation antenna systems that extend beyond conventional Massive MIMO architectures. The lecture focused on the challenges and opportunities associated with deploying a very large number of antennas to enhance communication reliability, spectral efficiency, and physical-layer security in future wireless networks.

The speaker elaborated on advanced signal processing techniques, antenna scalability, and robustness in high-density antenna environments. Emphasis was also placed on how such architectures can improve interference management, resilience, and secure transmission, making them highly relevant for 5G evolution and emerging 6G systems.

An interactive Q&A session followed the lecture, during which participants from both online and offline modes actively engaged with the speaker. Prof. Dinis addressed questions related to implementation challenges, system complexity, and future research directions, enriching the learning experience for the attendees.

Day 3: December 10th, 2025 (Session 1 - 10:00 to 11:00 _ IST)	
Resource Person:	**Dr. Narasimhulu Thoti, University of Oulu, FINLAND**
Topic:	**Semiconductor Device Landscape for Next-Generation Connectivity: Enabling Smart IoT and 6G Networks**

Dr. Thoti presented a comprehensive overview of the evolving semiconductor device ecosystem that underpins next-generation wireless connectivity. The lecture highlighted the critical role of advanced semiconductor materials, device architectures, and fabrication technologies in enabling smart IoT applications and future 6G networks.

The speaker discussed key enablers such as wide-bandgap semiconductors, energy-efficient RF and mixed-signal devices, and hardware challenges for ultra-high-frequency operation. Special emphasis was placed on how semiconductor innovations contribute to low-power operation, high reliability, and scalability, which are essential for massive IoT deployments and 6G use cases.

The session also covered current research trends and future directions, providing participants with valuable insights into the intersection of device-level innovation and system-level wireless performance. The lecture concluded with an interactive Q&A session, during which participants actively engaged with the speaker, seeking clarifications on device integration, commercialization challenges, and research opportunities in the 6G ecosystem.

Day 3: December 10th, 2025 (Session 2 - 11:30 to 12:30 _ IST)	
Resource Person:	**Prof. Eiji Oki, Kysoto University, JAPAN**
Topic:	**Designing Scalable Optical Circuit Switched Multi-Stage Networks with Performance Guarantees for Data Centers**

Prof. Oki delivered an insightful lecture focusing on the design principles and architectures of optical circuit-switched multi-stage networks tailored for large-scale data center environments. The session addressed the growing need for high bandwidth, low latency, and energy-efficient interconnection networks driven by cloud computing, AI workloads, and data-intensive applications.

The speaker elaborated on scalability challenges in modern data centers and presented multi-stage optical switching architectures that offer performance guarantees in terms of throughput, latency, and reliability. Key concepts such as traffic modeling, routing strategies, fault tolerance, and performance analysis were discussed with clarity, supported by analytical insights and practical design considerations.

Prof. Oki also highlighted recent research outcomes and real-world applicability of optical circuit-switched networks, emphasizing their potential to significantly improve data center network efficiency compared to conventional electronic switching approaches.

Day 3: December 10th, 2025 (Session 3 - 14:00 to 15:00 _ IST)	
Resource Person:	**Prof. Maxime Guillaud, INRIA, Lyon, FRANCE**
Topic:	**Advances in Wireless Channel Charting**

Prof. Guillaud presented an in-depth overview of wireless channel charting, an emerging data-driven approach aimed at learning radio environment representations directly from channel state information (CSI) without relying on explicit location data. The lecture highlighted how channel charting enables geometry-aware learning in wireless systems, which is crucial for future 5G-Advanced and 6G networks.

The session covered key theoretical foundations, including unsupervised and semi-supervised learning techniques, manifold learning, and dimensionality reduction methods applied to wireless channels. Prof. Guillaud explained how these techniques can be used to construct channel charts that preserve the local geometry of the propagation environment, enabling applications such as mobility management, beamforming, localization assistance, and radio resource optimization.

The speaker also discussed recent research advancements and experimental results, emphasizing the robustness of channel charting methods in complex and dynamic wireless environments. Practical challenges such as measurement noise, scalability, and real-time deployment were addressed, providing valuable insights for both researchers and practitioners.

The session concluded with an engaging question-and-answer interaction, where participants both online and offline actively discussed potential applications, implementation challenges, and future research directions related to wireless channel charting.

Day 3: December 10th, 2025 (Session 4 - 15:30 to 16:30 _ IST)	
Resource Person:	**Prof. Ruidong Li, Kassnazawa University, JAPAN**
Topic:	**Decentralized Intelligent Metaverse and Quantum Network**

Prof. Li presented an insightful lecture on the convergence of decentralized intelligence, metaverse architectures, and quantum networking, emphasizing their significance in shaping future 6G and beyond communication ecosystems. The session began with an overview of the intelligent metaverse, highlighting how AI-driven decentralized architectures can enable scalable, secure, and immersive digital environments.

The speaker elaborated on the role of decentralized intelligence in reducing latency, improving privacy, and enhancing reliability through edge computing, distributed learning, and blockchain-inspired coordination mechanisms. Prof. Li further discussed how quantum networks can complement the metaverse by providing ultra-secure communication, quantum key distribution (QKD), and new paradigms for networking beyond classical limits.

The lecture also covered key use cases and research challenges, including interoperability, network orchestration, security, and the integration of quantum communication technologies with existing and future wireless infrastructures. The talk provided participants with a forward-looking perspective on how quantum networking and intelligent metaverse systems may co-evolve as foundational components of next-generation networks.

Valedictory: December 10th, 2025

The Valedictory Ceremony of the 2025 IEEE ComSoc School Series Andhra Pradesh (Virtual Event), organized by the MITS IEEE Student Branch Chapter in association with the Department of Electronics and Communication Engineering, Madanapalle Institute of Technology & Science (MITS), Deemed to be University, was held on 10th December 2025 from 4:30 PM to 5:00 PM IST in a hybrid mode, with participation through the SpatialChat platform (online) and at the Scaleup Classroom, Lakshmi Block, MITS (offline).

The session commenced with a summary and report presentation by Mrs. U. Vijaya Lakshmi, Senior Manager – International Relations Office (IRO), who presented a comprehensive overview of the three-day event, highlighting the technical sessions, global participation, and overall summary of the IEEE ComSoc School Series.

This was followed by feedback from IEEE ComSoc student members, both online and offline, who shared their learning experiences and expressed appreciation for the high-quality technical content, interactive sessions, and the opportunity to engage with internationally renowned experts in wireless communications, 5G/6G technologies, and emerging networks.

Dr. Sremmant Basu, Professor & Dean – Administration, International Relations & UGC Affairs, addressed the gathering on behalf of MITS and emphasized the importance of international collaborations, interdisciplinary learning, and industry–academia engagement in advancing next-generation communication technologies

The Special Address was delivered by Dr. P. Ramanathan, Principal, MITS, who congratulated the organizing team and participants for the successful completion of the global event and highlighted MITS's commitment to hosting high-impact international academic and professional programs in collaboration with IEEE.
Representing the IEEE Hyderabad Section, Mr. Sreenivas Jasti, Treasurer, addressed the audience and appreciated the meticulous planning, coordination, and execution of the event. He also acknowledged the active involvement of students and faculty in promoting IEEE activities and professional development.

The Address by IEEE Communications Society was delivered by Ms. Tara McNally, Senior Program Manager, IEEE ComSoc Educational Services Board, who commended MITS and the IEEE Student Branch for organizing a well-structured and globally engaging School Series event. She highlighted the significance of such initiatives in strengthening student engagement and knowledge dissemination within the ComSoc community.

The valedictory session concluded with a Vote of Thanks proposed by Dr. E. Aravindraj, Assistant Professor, Department of ECE, who expressed sincere gratitude to IEEE ComSoc, IEEE Hyderabad Section, distinguished speakers, dignitaries, organizing committee members, volunteers, and participants for their invaluable support and contributions toward the successful completion of the event.

Outcome of the School Series Event, participants will be able to:

After participating in the 2025 IEEE ComSoc School Series Andhra Pradesh (Virtual Event), participants were able to:

1. **Understand Emerging Wireless Technologies**

Gain in-depth knowledge of 5G, 6G, AI-native networks, NTN, edge intelligence, optical networking, quantum networks, and metaverse technologies from global experts.

2. **Apply Research Insights to Real-World Problems**

Correlate theoretical concepts with industry-driven use cases, including applications from Nokia, Ericsson, Bell Labs, MathWorks, and academic research labs.

3. **Enhance Research and Innovation Skills**

Identify future research directions, open challenges, and innovation opportunities in wireless communications, networking, and next-generation connectivity.

4. **Develop Global Technical Exposure**

Interact with international speakers and participants from over 25 countries, fostering cross-cultural academic and professional collaboration.

5. **Strengthen Professional and Ethical Competence**

Understand the importance of secure, reliable, energy-efficient, and sustainable network design aligned with global standards and societal needs.

6. **Improve Industry–Academia Engagement**

Gain awareness of industry expectations, tools, and platforms (AI, MATLAB-based simulations, network automation) relevant to careers in telecommunications and networking.

7. **Build Communication and Collaboration Skills**

Actively participate in interactive Q&A sessions, technical discussions, and breakout interactions in both online and offline modes.

Mapping with Sustainable Development Goals (SDGs):

The event aligns with the following United Nations Sustainable Development Goals (SDGs):

SDG 4 – Quality Education

- Promoted inclusive, equitable, and quality technical education through global expert lectures and hybrid learning platforms.
- Enhanced lifelong learning opportunities for students, researchers, and professionals in advanced communication technologies.

SDG 9 – Industry, Innovation and Infrastructure

- Encouraged innovation in wireless communications, AI-driven networks, IoT, and 6G infrastructure.
- Highlighted the role of resilient and sustainable digital infrastructure in future smart societies.

SDG 11 – Sustainable Cities and Communities

- Addressed communication technologies enabling smart cities, intelligent transportation, and connected communities through advanced wireless systems.

SDG 12 – Responsible Consumption and Production

- Emphasized energy-efficient network design, spectrum optimization, and sustainable deployment of future communication technologies.

SDG 17 – Partnerships for the Goals

- Strengthened global partnerships among IEEE ComSoc, international universities, industry leaders, and student communities.
- Fostered collaboration across academia, industry, and professional bodies for knowledge sharing and capacity building.