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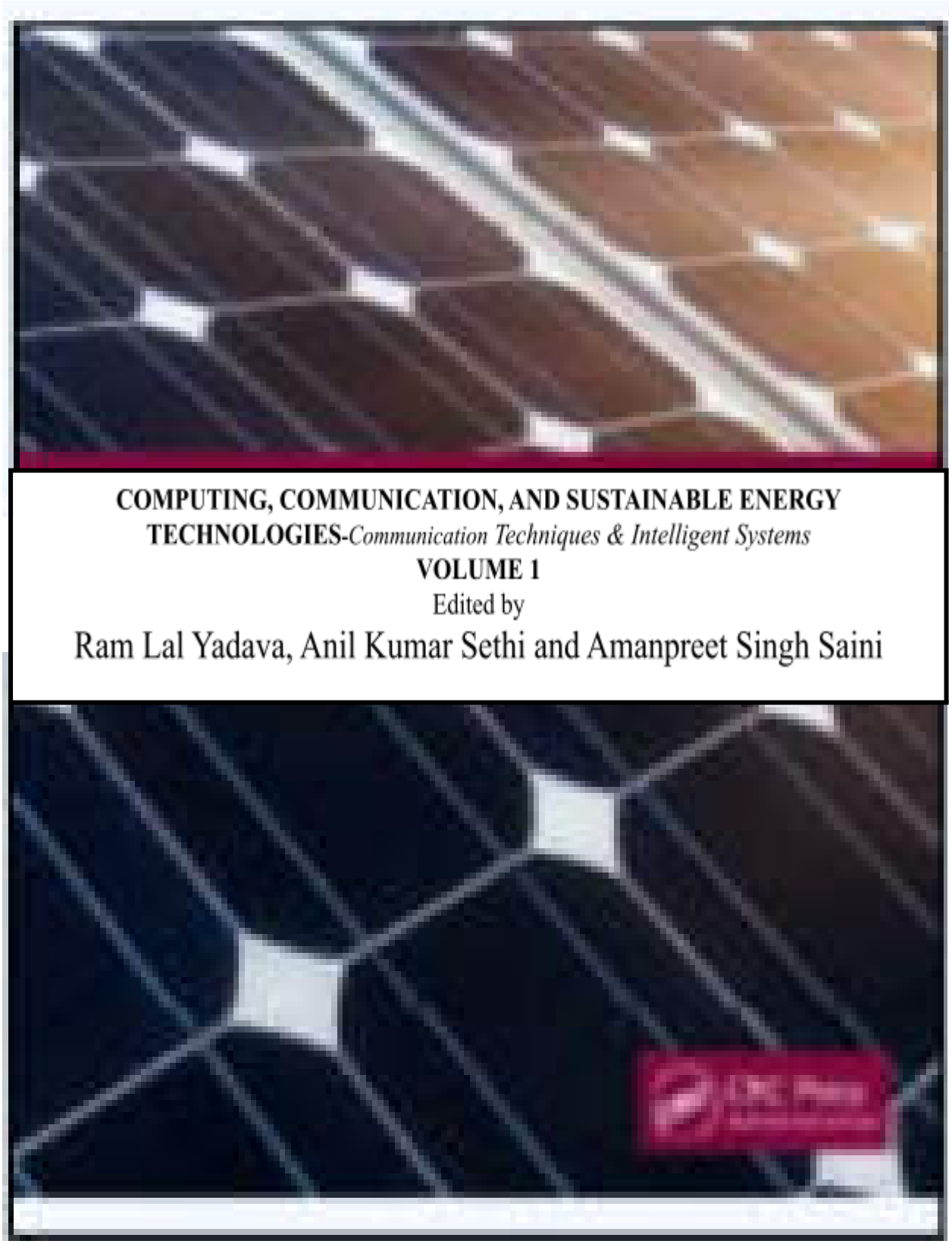

COMPUTING, COMMUNICATION, AND SUSTAINABLE ENERGY TECHNOLOGIES

Communication Techniques & Intelligent Systems

This book emerges from the exchange of research insights and innovative ideas in the domains of **Computing, Communication, and Sustainable Energy Technologies**, with a focused emphasis on *Communication Techniques and Intelligent Systems*. It brings together contemporary research addressing smart computing paradigms, intelligent communication frameworks, and sustainable energy-driven technological solutions.

With special attention to intelligent networks, signal processing, IoT-enabled systems, machine learning applications, and smart energy management, this proceedings volume serves as a comprehensive resource on technologies driving next-generation sustainable and intelligent systems.

Key features of this book include:

- A broad exploration of current research trends in communication techniques, intelligent systems, and sustainable energy technologies.
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- Analytical insights into challenges, emerging opportunities, and future research directions in sustainable communication and intelligent computing solutions.

This book is intended for research scholars, academicians, undergraduate and postgraduate students, Ph.D. candidates, industry professionals, technologists, and researchers seeking to enhance their understanding of intelligent communication systems and sustainable technological innovations.

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PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON COMPUTING, COMMUNICATION, AND SUSTAINABLE ENERGY TECHNOLOGIES-*Communication Techniques & Intelligent Systems (I3CSET-2025), GREATER NOIDA, U.P. INDIA, 28TH– 29TH NOVEMBER, 2025*

COMPUTING, COMMUNICATION, AND SUSTAINABLE ENERGY TECHNOLOGIES-*Communication Techniques & Intelligent Systems*

VOLUME 1

Edited by

Ram Lal Yadava, Anil Kumar Sethi, and Amanpreet Singh Saini

Galgotias College of Engineering and Technology,
Knowledge Park II,

Greater Noida, Uttar Pradesh, India

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Preface

On behalf of the Organizing Committee, I would like to extend my heartiest welcome to all participants of the **International Conference on Computing, Communication, and Sustainable Energy Technologies (I3CSET-2025)**. I3CSET-2025 is a non-profit international conference that provides a platform for engineers, academicians, researchers, and industry professionals to discuss recent advancements and future research directions in computing, communication techniques, intelligent systems, and sustainable energy technologies.

The conference promotes knowledge sharing and collaboration among experts from diverse domains. The conference proceedings, titled ***Computing, Communication, and Sustainable Energy Technologies – Communication Techniques & Intelligent Systems***, are technically associated with **CRC Press, Taylor & Francis**, and are intended for indexing in **Scopus**. The conference featured multiple technical tracks covering key areas of Computer Engineering, Intelligent Computing, Communication Systems, and Sustainable Energy Technologies.

This two-day international conference (I3CSET-2025) was organized at **Galgotias College of Engineering & Technology, Greater Noida**, on **28th and 29th November 2025**. The inauguration ceremony was held on **28th November 2025** at **D-Block, GCET**. The ceremony was graced by **Dr. Mohammad Rihan, Director General of the National Institute of Solar Energy (NISE), Govt of India** as the Chief Guest. During the inauguration ceremony, **Professor Vikram Bali, Director, GCET**, welcomed the dignitaries and participants with their inaugural addresses. The Conference Chair, **Dr. Ram Lal Yadava**, highlighted that the conference received more than **750 research paper submissions from over ten countries**. After a rigorous blind peer-review process involving two reviewers per paper, more than **190 high-quality research papers** were accepted and invited for presentation.

The Chief Guest, Guests of Honour, and other eminent experts delivered insightful lectures on emerging topics in **Artificial Intelligence, Intelligent Computing, Communication Systems, and *Sustainable Energy Technologies***, motivating participants toward quality research and innovation. The inaugural session concluded with a vote of thanks delivered by **Dr. Shilpee Patil, Dept of ECE, GCET**. Over the course of the two-day conference, more than **190 research papers** were presented across **24 technical sessions**, fostering vibrant discussions and knowledge exchange. The valedictory session was presided over by the Conference Co-Chair **Mr Amanpreet Saini** on behalf of the Organizing Committee. He expressed sincere gratitude to **Mr. Suneel Galgotia, Chancellor**, **Dr. Dhruv Galgotia, CEO**, **Professor Vikram Bali, Director, GCET**,, faculty members of the ECE Department, and all student volunteers for their cooperation and support.

Finally, I extend my sincere thanks to all authors, participants, reviewers, and organizing committee members for their valuable contributions in making I3CSET-2025 a success. I believe this conference has provided a stimulating platform and will contribute meaningfully to future research and technological advancements.

On behalf of the Editors

Dr. Ram Lal Yadava

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Acknowledgements

It gives me immense pleasure to note that **Galgotias College of Engineering and Technology (GCET), Greater Noida, India**, successfully organized the **International Conference on Computing, Communication, and Sustainable Energy Technologies (I3CSET-2025)** on **28th and 29th November 2025**.

On behalf of the Organizing Committee, I express my sincere gratitude to our **Chief Patron, Hon'ble Shri Suneel Galgotia, Chancellor, Galgotias University**, and **Hon'ble Dr. Dhruv Galgotia, CEO, Galgotias University**, for their constant encouragement and for providing all necessary support and facilities that contributed significantly to the successful organization of I3CSET-2025.

I also extend my heartfelt thanks to **Professor Vikram Bali, Director, GCET**, and **Prof. (Dr.) Brijesh Singh, Dean of Academics, GCET**, for their continuous guidance, motivation, and unwavering support throughout the planning and execution of the conference.

I sincerely thank all the distinguished keynote speakers, invited guests, session chairs, and authors for their valuable contributions and active participation. Special thanks are due to the reviewers for their time and expertise in maintaining the quality of the conference proceedings.

Finally, I express my deep appreciation to all members of the organizing committee, faculty members, and student volunteers for their dedicated efforts and teamwork, which played a vital role in making **I3CSET-2025** a grand success.

Thank you.

Prof.(Dr.) RAM LAL YADAVA

Organizing Chair I3CSET-2025,

Galgotias College of Engineering and Technology

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Editors Biographies

R.L.Yadava, Ph.D., is a Professor in the Department of Electronics and Communication Engineering, Galgotias College of Engineering and Technology (GCET), Gr. Noida, U.P, INDIA. He received his doctorate in Electronics Engineering from the IIT-BHU University. He joined VIT University, Vellore, in 2001 and served as Head of the Microwave Division, Coordinator (R&D), and Coordinator (UG)

of Electrical Sciences. During his service at VIT University, he was deputed as visiting faculty to Kigali Institute of Science and Technology (KIST), Kigali, Rwanda, Central Africa. He has served as coordinator of M.Tech, HOD, and Head Exams at GCET. Dr. Yadava has organized several guest lectures, short-term training programs, and conferences sponsored by DST and AICTE, Govt. of India, in the field of microwave antennas and wireless & optical communications. His research areas include: microwave antennas and communications. He is an associate editor of the Journal of Information,

Intelligence and Knowledge, USA, and also a member of IEEE, EAI, ISTE, and SEMCE (I). He has guided five Ph.D. scholars, 30 M.Tech students, and several B. Tech projects, and he has 150 publications to his credit in IEEE, International/ National Journals, Conferences, and Symposia. He is the reviewer of the International Journal of Electronics, Springer Nature, IEEE Access, and Journal of Electromagnetic Waves and Applications.

Dr. Anil Kumar Sethi is a Professor in the Department of Mechanical Engineering at Galgotias College of Engineering & Technology, Greater Noida, with over 25 years of teaching and academic experience. He holds a Ph.D. in Mechanical Engineering and an M.E. in Welding Engineering from IIT Roorkee. His academic and research interests include thermal engineering, renewable energy, advanced materials, artificial intelligence applications in engineering, and manufacturing processes. Dr. Sethi has published extensively in reputed international journals and IEEE conferences and is a German patent holder. He is a Life Member of ISTE and has actively participated in numerous FDPs, workshops, and international conferences. His career reflects strong contributions to teaching, research, and academic leadership.

Mr. Amanpreet Singh Saini

Mr. Amanpreet Singh Saini is an academic professional and researcher with interests in intelligent systems, computing technologies, and applied communication solutions. He has actively contributed to research, technical training, and academic coordination. His involvement in conference organization, editorial support, and scholarly activities reflects his commitment to promoting quality research and innovation in emerging technological domains.

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