

**2nd International Conference on
Innovative Trends in
Engineering and Technology
ICITET-2024**

Organized by



**K J College of Engineering and
Management Research, Pune**

Accredited by NAAC, Under Academic Mentorship of COEP

(Affiliated to SavitribaiPhule Pune University (SPPU), Approved by Govt. of Maharashtra,

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Near KhadimachineChowk, Kondhwa Annexe, Pune 411 048.

Date: 10th & 11th April 2024

In Association with



www.conferenceworld.in www.iardo.com

ISBN: 978-93-91535-73-5

**2nd International Conference on
Innovative Trends in
Engineering and Technology**

ICITET-2024

Editors

**Dr. Suhas S. Khot
Dr. Nikita J. Kulkarni
Dr. Pramod U. Chavan
Dr. Rohan S. Kulkarni**

Publish By:
A.R. Research Publication

Preface

Conference world and AR Research Publication is a fast-growing group of academicians in Engineering, Sciences, and Management. AR Research Publication is also known for its fast reply and zero-error work. The conference world has organized various conferences at renowned places namely Delhi University; New Delhi, Jawaharlal Nehru University; New Delhi, PHD Chamber of Commerce and Industry New Delhi, YMCA New Delhi, India International Centre New Delhi, Sri Venkateswara College of Engineering and Technology, Andhra Pradesh, Vedant Engineering Kota and many more places across the country.

We are very pleased to introduce the proceedings of the 2nd International Conference on Innovative Trends in Engineering and Technology were addressed by the papers presented at the conference. The level of interest in the subject matter of the conference was maintained from previous events and over 115 suitable papers were submitted for presentation at the conference.

Papers were well represented at the conference to arouse a high level of international interest. The presented papers maintained the high promise suggested by the written abstracts and the program was chaired in a professional and efficient way by the session chairmen. The program was chaired professionally and efficiently by the session chairmen also highly gratifying, showing the high level of interest in the subject. This Proceeding provides a permanent record of what was presented. They indicate the state of development at the time of writing of all aspects of this important topic and will be invaluable to all authors in the field for that reason. Finally, it is appropriate that we record our thanks to our fellow members of the Technical Organizing Committee for encouraging participation from those areas. We are also indebted to those who served as chairmen, without their support, the conference could not have been the success that it was. We also acknowledge the authors themselves, without whose expert input there would have been no conference. Their efforts made a great contribution to its success.

About the Conference

The Conference is aimed to bring together inquisitive academicians, industry experts, researchers and practitioners to share their innovative and revolutionary ideas, resolving significant issues, and contributing towards inculcating a healthy and coexistent learning ambiance. The conference aspires to encircle all prominent avenues in the field of Engineering and Technology. The conference is an umbrella of boundless experience and the inquisitive thirst of exploring exemplary concepts under one roof.

About IARDO

International Association of Research and Developed Organization (IARDO) is a leading organization in the field of academic research activities under the banner of India Educational Charitable Trust (Regd).

International Association of Research and Developed Organization (IARDO) is an apex body that promotes and encourages commendable achievements from all over the country. The organization under conference world regularly organizes national and international level conferences with the help of its members to promote socially responsible education practices and sustainable development in economic as well social front in India.

About the College

KJCOEMR was established in the year 2009. We offer four year full time degree course in 'Bachelor of Engineering' with specialization in Civil, Computer, Electrical, Electronics and Telecommunication, and Mechanical Engineering and four post graduate courses in Computer Engineering, Computer Networks, Structural Engineering, and Design Engineering. The college is under Academic Mentorship of COEP and accredited by NAAC. The college is approved by AICTE, DTE, Govt. of Maharashtra and is affiliated to SavitribaiPhule Pune University, Pune.

The institute was founded with the noble vision of producing professionals and leaders of high academic caliber capable of facing the challenges posed by advancing technology and emerging knowledge areas. Our goal is to professionally prepare students and instill in them strong motivation and commitment to serve humanity. Established in 2009, KJCOEMR offers a four-year full-time Bachelor of Engineering degree with specializations in Civil (60), Computer (180), Electrical (60), Electronics & Telecommunication Engineering (60), Electronics & Communication (Advanced Communication Technology) (60), Electronics Engineering (VLSI Design & Technology) (60), and Mechanical Engineering (90). Additionally, we provide four postgraduate courses in Computer Engineering (12), Computer Networks (12), Civil-Structural Engineering (24), and Mechanical-Design Engineering (12). The College is approved by AICTE & DTE, Govt. of Maharashtra, and is affiliated with SavitribaiPhule Pune University, Pune.

Our modern state-of-the-art infrastructure and facilities are developed to create a conducive atmosphere for teaching, learning, and all-round student development. To achieve our objectives, we have qualified teachers and staff dedicated to maintaining high standards. The majority of our faculty members possess more than 10 years of academic and/or industrial experience in their respective disciplines. Our teaching methodology includes well-prepared lecture notes, the latest presentation techniques, interactive sessions, and dialogue between students and teachers. We actively encourage one-to-one interactions between teachers and students for both co-curricular and extra-curricular activities.

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Proceeding of the conference has been published with **ISBN: 978-93-91535-73-5**

2nd International Conference on Innovative Trends in Engineering and Technology [ICITET-2024] organized at KJ College of Engineering and Management Research, Pune, Near Khadi Machine Chowk, Kondhwa Annexe, Pune 411 048. Total 215 papers were received for the conference and 115 papers were shortlisted by the committee.

MESSAGE FROM PRESIDENT



It gives me immense pleasure that the KJ College of Engineering and Management Research has organized 2ndInternational Conference on Innovative Trends in Engineering and Technology (ICITET-2024), in association with International Association of Research and Developed Organization (IARDO) and Conference World. Ever since the inception of our institute, we have been striving for excellence in various departments of Engineering and at the very same time marching forward with the mission of professional as well as technical development.

I believe in promoting events to be organized in KJEI which opens research and innovation avenues for students. This 2ndInternational Conference on Innovative Trends in Engineering and Technology is one such step towards motivating students and researchers. The conference greatly encourages graduate and Post-graduate students, research scholars and faculty to present innovative ideas and latest discoveries in the field of engineering and Technology. I would like to extend my gratitude towards Research and development cell and all staff who had done excellent job for the success of this conference. I take this opportunity to extend my best wishes to all the participants of this conference for their future endeavors and also aspire that more and more people opt for research and bring laurels to themselves and to the field of education.

Shri. KalyanJadhav

President, KJEI

MESSAGE FROM EXECUTIVE DIRECTOR



At the outset, my appreciation and congratulations to KJ College of Engineering and Management Research for successfully organizing 2nd International Conference on Innovative Trends in Engineering and Technology (ICITET-2024) on 10th and 11th April 2024. Education in general and technical education in particular, must be relevant to rapidly changing needs of the society, industry and business houses. The educational environment must be dynamic and quickly adaptable, so that professionals are capable of shouldering all-encompassing global responsibilities.

The conference brought together students, researchers and educators of varied domains to share their ideas, views and also to explore their technical abilities. I am confident that this event will be useful to researchers and academicians to enhance their knowledge on the research topics of their chosen field.

I express my sincere thanks to all well-wishers for their valuable guidance and unstinted support, who have been directly or indirectly involved in organizing this conference. May you all always be in pursuit of Excellence.

Maj Gen. Sameer Kalla, VSM (Retd),

Executive Director, KJEI

MESSAGE FROM TECHNICAL DIRECTOR



I would like to begin by expressing my gratitude and congratulations to KJ College of Engineering and Management Research for the successful organization of the 2nd International Conference on Innovative Trends in Engineering and Technology (ICITET-2024) held on the 10th and 11th of April, 2024. Education, especially technical education, must evolve to meet the rapidly changing demands of society, industry, and the business sector. It is essential for the educational climate to be dynamic and adaptable, enabling professionals to take on comprehensive global duties.

This conference acts as a guiding light for intellectual exchange, promoting dialogue that goes beyond geographical limitations and disciplinary boundaries. Through keynote speeches, paper presentations, and interactive sessions, our goal is to nurture a lively environment where ideas are exchanged, perspectives are broadened, and collaborations are established.

I sincerely thank all the supporters whose invaluable advice and unwavering support were indispensable in organizing this conference. May you all persist in your pursuit of excellence.

Dr. Ajay M. Fulambarkar

Technical Director, KJEI

MESSAGE FROM PRINCIPAL



KJCOEMR is one amongst the reputed technical Institute imparting finest quality education in Pune. The evolution of the Institute over the years has witnessed strong blend of state-of-the-art infrastructure and intricately intertwined human resource committed to provide professional education with thrust on creativity and innovation. Therefore, our main focus is on adapting the teaching-learning process that leads the research orientation to expand personal as well as national growth.

"A desire can change nothing....A decision can change something.....But a determination can change everything.....!!!!"

We encourage innovative ideas by faculty and students in overall development of the learners. Along with the academics the students also participate in extracurricular and co-curricular activities through active cultural, sports, social groups. I wish you a very happy and academically highly rewarding student's life in KJCOEMR and hope that you will be a source of pride for this prestigious institution.

Dr. Suhas S. Khot

Patron,

2nd International Conference on Innovative Trends in Engineering and Technology (ICITET-2024)

MESSAGE FROM CONVENER



It is fair to conclude that the **2nd International Conference on Innovative Trends in Engineering and Technology (ICITET-2024)** held at KJ College of Engineering and Management Research in association with the conference world on 10th and 11th April 2024 was a great success. So many people have contributed in so many ways to turn this event into a smoothly running meeting with many very interesting presentations and a very good atmosphere for discussion and networking.

Management of KJCOEMR has helped in obtaining the necessary administrative approval for organizing the event in our Campus. They supported in all possible manner to organize this conference. My special thanks to our Chief Guest Dr. D V Jadhav, Joint Director, DTE Pune, Dr. Pradeep V. Jadhav, Principal, BVCOEW, Pune, Guest of honor, Dr. B.D. Jadhav, BOS E&TC for their gracious presence at the event. I extend my sincere thanks to all Coordinators, ICITET-2024. I am thankful to my faculty colleagues and non-teaching staff members for their constant help and guidance that radiated a source of energy within me. I feel proud and thank you for making this event a successful one. I am thankful for the enormous and high-quality support of all authors, reviewers and session chairs.

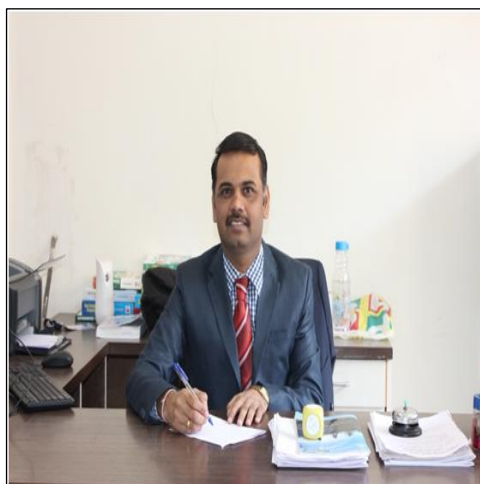
I wish that ICITET will keep on growing in coming years with more impact on the International research community.

Dr. Nikita Kulkarni,

Convener,

**International Conference on Innovative Trends in Engineering and Technology
(ICITET-2024)**

MESSAGE FROM CONVENER



Dear Participants,

It is with immense pleasure and a sense of profound responsibility that I extend my warmest greetings to all of you for the **2nd International Conference on Innovative Trends in Engineering and Technology (ICITET-2024)** held at K J College of Engineering and Management Research Pune, an international platform where ideas converge, innovations flourish, and collaborations take flight.

Your presence signifies not only your commitment to advancing knowledge but also your dedication to addressing the pressing challenges and seizing the myriad opportunities that lie at the intersection of our diverse fields.

This conference serves as a beacon of intellectual exchange, fostering dialogue that transcends geographical boundaries and disciplinary confines. Through keynote addresses, paper presentations, and interactive sessions, we aspire to cultivate a vibrant ecosystem where insights are shared, perspectives are enriched, and partnerships are forged.

I extend my heartfelt gratitude to the organizing committee, whose dedication and tireless efforts have been instrumental in bringing this event to fruition. Their commitment to excellence has ensured that every aspect of this conference is meticulously planned and executed, promising a seamless and enriching experience for all participants.

With best wishes,

Dr. Pramod Chavan

Convener,

2nd International Conference on Innovative Trends in Engineering and Technology (ICITET-2024)

MESSAGE FROM CONVENER



It is with great satisfaction that we reflect on the tremendous success of the 2nd International Conference on Innovative Trends in Engineering and Technology (ICITET-2024), which took place on April 10th and 11th, 2024, at KJ College of Engineering and Management Research in collaboration with Conference World. The event was marked by a seamless flow of activities and a lineup of engaging presentations, and it provided an excellent environment for discussion and networking.

The management of KJCOEMR played a crucial role, securing all necessary administrative permissions to host this significant event on our campus and offering unwavering support throughout the organization process. I am particularly grateful to our distinguished Chief Guest, Dr. D.V. Jadhav, Joint Director of DTE Pune, and our esteemed guests of honor, Dr. Pradeep V. Jadhav, Principal of BVCOEW, Pune, and Dr. B.D. Jadhav from BOS E&TC. Their presence greatly enhanced the event.

I would also like to extend my heartfelt thanks to all the Coordinators of ICITET-2024. My appreciation also goes out to my faculty colleagues and the non-teaching staff, whose ongoing support and guidance were invaluable and truly energizing. I am proud and grateful to everyone who contributed to making this event a success. I am hopeful that ICITET will continue to expand and have an even greater impact on the international research community in the future.

Dr. Rohan Kulkarni

Convener,

2nd International Conference on Innovative Trends in Engineering and Technology (ICITET-2024)

Published by

AR Research Publication,

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This edition can be exported from India only by the publishers, AR Research Publication (India) ISBN: **978-93-91535-73-5**

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