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Proceedings of

National Conference on Recent Trends in Mechanical Engineering (NCRTE -2024)

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**Proceedings of National Conference on Recent Trends in Mechanical
Engineering**

(NCRTME -2024)

Edited by

Dr. M. Chandrasekaran,

Dr. C. Dhanasekaran

Dr. S. Sivaganesan

Volume I April 2024

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Price: Rs. 500/-

ISBN: 978-81-972661-8-8

Published by and copies can be had from:

Imaginex Inks Publication

2/158, Kurinji Nagar First St, Ponnai Nagar, Irumbuliyur, Vandalur,

Chennai 600048, Tamil Nadu, India.

Phone: 9750663871, 9962991057

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<https://www.imaginexinkspublication.com/>

**National Conference on Recent Trends in
Mechanical Engineering
(NCRTME -2024)**

22nd April 2024

Organized by

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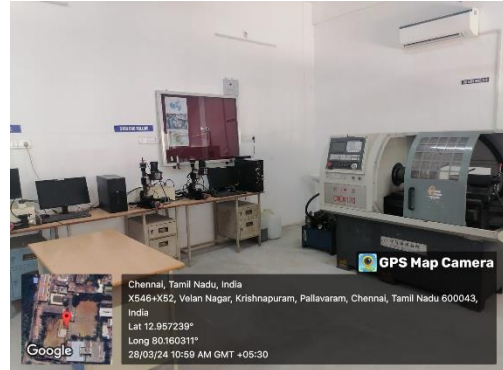
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DEPARTMENT OF MECHANICAL ENGINEERING

The Department of Mechanical Engineering at Vels Institute of Science Technology and Advanced Studies, was established in 2009. Following the institution's achievement of Deemed University status under the aegis of VISTAS in 2008, the department embarked on a new phase of academic and research excellence within the School of Engineering. Renowned for its comprehensive research domains, the department focuses on pivotal areas such as thermal engineering, fluid mechanics, materials science, robotics, and sustainable manufacturing, alongside emerging fields like nanotechnology and additive manufacturing. Equipped with state-of-the-art facilities and laboratories, the Department of Mechanical Engineering is committed to providing an enriching academic environment that promotes innovation, practical skills development, and a deep understanding of mechanical engineering principles. Importantly, the department is accredited by the National Board of Accreditation (NBA), underscoring its commitment to maintaining the highest standards of education and research. This accreditation assures students and stakeholders of the quality and relevance of the curriculum, preparing students for successful careers in a rapidly evolving global landscape.



Message from the Chancellor's Desk



Dr. Ishari K. Ganesh
Founder-Chancellor
VISTAS

I am pleased to extend a warm welcome to all the participants of the National Conference on Recent Trends in Mechanical Engineering (NCRTE-2024) scheduled for 22 April 2024. This significant event is proudly organized by the Department of Mechanical Engineering at VISTAS.

The field of Mechanical Engineering is pivotal in shaping the future of technology and industry. This conference will serve as an excellent platform for academicians, researchers, and practitioners to explore the latest innovations and trends in the discipline. It aims to foster an environment of knowledge sharing, collaboration, and networking among professionals from diverse backgrounds and expertise.

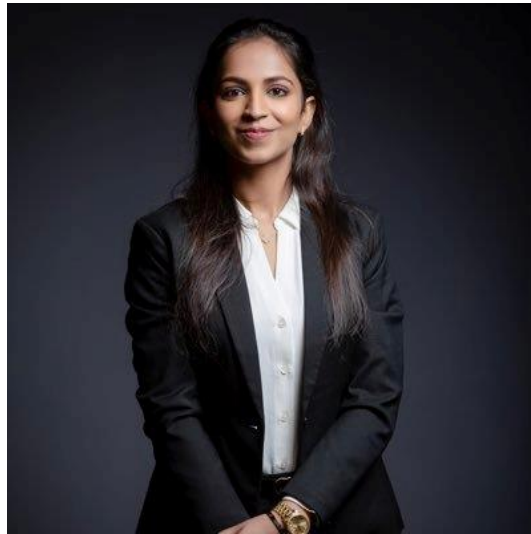
I am confident that NCRTE-2024 will inspire a multitude of enriching discussions and lead to significant advancements in the study and application of Mechanical Engineering. The insights gained from this conference are sure to contribute to the ongoing development and transformation of the sector.

I extend my best wishes for a successful and productive conference to all organizers, delegates, and participants. May this conference spark innovative ideas and forge lasting connections that propel forward the realms of science and technology.

Best Wishes,

Dr. Ishari K. Ganesh
Founder-Chancellor
VISTAS

Message from the Vice President desk



Dr. Preethaa Ganesh

Vice President

Vels Group of Institutions

I am pleased to note that the Department of Mechanical Engineering is organizing the National Conference on Recent Trends in Mechanical Engineering (NCRTME-2024), which will be held on 22 April 2024 at the VISTAS campus, Pallavaram, Chennai. This conference will provide a forum for sharing new ideas and exploring the latest advancements in the field of Mechanical Engineering.

Mechanical engineering is at the forefront of developing solutions that impact various sectors including automation, aerospace, and manufacturing. As the world leans towards more sustainable and efficient technologies, the role of mechanical engineers becomes even more critical. Innovations such as AI integration in automated systems and improvements in materials science are pushing the boundaries of what is possible in mechanical engineering.

The conference aims to promote a scientific gathering and serve as a platform to exchange research ideas, fostering collaborations between research groups and industries. This is an excellent opportunity for delegates to network with peers and industry leaders to discuss the challenges and opportunities in today's mechanical engineering landscape.

I extend my best wishes to the Department of Mechanical Engineering for organizing this conference. I thank all the sponsors for their support and also thank all the delegates. I am confident that this National Conference will be a rewarding and enriching experience for all participants.

Best Regards,

Dr. Preethaa Ganesh

Vice President

Vels Group of Institutions

Message from the Vice Chancellor's Desk



Dr. S. Sriman Narayanan
Vice-Chancellor
VISTAS

I am delighted to note that the Department of Mechanical Engineering, School of Engineering, VISTAS is organizing the National Conference on Recent Trends in Mechanical Engineering (NCRTME-2024), which will take place on 22 April 2024. This conference is an excellent initiative to spotlight the latest innovations and trends in mechanical engineering that are pivotal for technological advancement and industrial development.

I firmly believe that NCRTME-2024 will enhance the quality of research and foster increased collaboration both within the country and internationally. The conference will serve as a vital platform for researchers from academic and industrial backgrounds to present their findings, discuss them critically, and explore viable solutions to the engineering challenges we face today.

Participants will have the opportunity to share their research experiences, discuss the challenges they have faced, the solutions they have implemented, and initiate potentially fruitful academic and industry partnerships.

I am confident that the efforts of the Organizing Committee will result in an engaging and informative conference, with high-quality papers and impactful presentations that will benefit all attendees. The conference is poised to ignite further research and study into emerging trends and innovations in mechanical engineering.

My heartfelt congratulations go to the entire team involved, and I wish for the grand success of NCRTME-2024.

Best Regards,

Dr. S. Sriman Narayanan

Vice-Chancellor

VISTAS

PREFACE

Welcome to the proceedings of the National Conference on Recent Trends in Mechanical Engineering (NCRTME – 2024), hosted in an environment where innovation and technology meet to shape the future of our industry. This publication is a compilation of the groundbreaking research, thoughtful insights, and pioneering developments presented at the conference, held 22nd April, at Department of Mechanical Engineering, VISTAS.

This year's conference theme, "Engineering Innovations for a Sustainable Future," reflects our commitment to advancing the mechanical engineering field while addressing the global challenges of sustainability and technology integration. Our focus areas—ranging from Advanced Manufacturing Processes to Renewable Energy and Energy Storage—highlight the diverse yet interconnected nature of modern mechanical engineering challenges and solutions.

The papers included in these proceedings have undergone rigorous peer review by an international panel of experts and represent high-quality, impactful research. They provide a snapshot of the cutting-edge advancements that our field is making in various domains, including Thermal and Fluid Engineering, Materials Engineering, Robotics and Automation, Automotive Engineering, and more.

We are proud to include contributions from a global community of scholars, researchers, and professionals. These proceedings not only showcase the latest academic research but also feature industry perspectives that bring practical insights into current and future technology applications in mechanical engineering.

As we look to the future, the discussions initiated and the knowledge shared at NCRTME – 2024 are steps toward fostering innovation and collaboration across disciplines. This conference is not just a venue for sharing knowledge but also a catalyst for forming partnerships that transcend geographical and disciplinary boundaries.

We extend our heartfelt gratitude to all the contributors, reviewers, and organizers who have worked tirelessly to make this conference a success. Your dedication to the pursuit of knowledge and innovation in mechanical engineering is what makes NCRTME a key event in our field.

We hope that these proceedings will serve as a valuable resource for you and inspire continued excellence and collaborative efforts in mechanical engineering. May the ideas and research presented here propel us toward a more sustainable, efficient, and technologically advanced future.

Dr. M. Chandrasekaran

Dr. C. Dhanasekaran

Dr. S. Sivaganesan

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Investigation of The Properties of Tig Welded Dissimilar Alloys of Inconel X750 and Inconel 718 Utilizing MOORA Techniques

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Abstract

Tungsten Inert Gas (TIG) welding is capable of producing high-quality welds with a remarkable level of precision, making it a widely utilized technique in the modern automotive and aerospace sectors. Within the scope of this study, the current research implements the Taguchi single objective function and multi-objective optimization method based on ratio analysis (MOORA) to identify the most effective combination of yield strength, tensile strength, and elongation in the TIG welding process of dissimilar metals such as INCONEL 718 and INCONEL X750. The key input parameters considered include welding speed, current, and gas flow rate. The findings indicate that the optimal combination of input parameters, leading to a maximum tensile strength of 623.62 MPa, yield strength of 571.85 MPa, and 12.2 mm elongation, is achieved at a welding current of 60 Amps, welding speed of 125 mm/min, and gas flow rate of 12 l/min.

Keywords: TIG welding, Dissimilar alloys, Inconel X750, Inconel 718, Moora Technique

ISBN 978-81-972661-8-8

