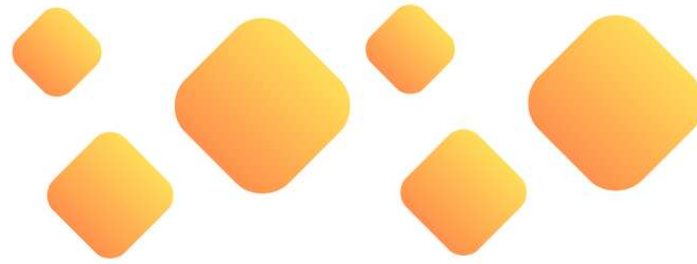




VEERMATA JIJABAI TECHNOLOGICAL INSTITUTE
MECHANICAL ENGINEERING DEPARTMENT



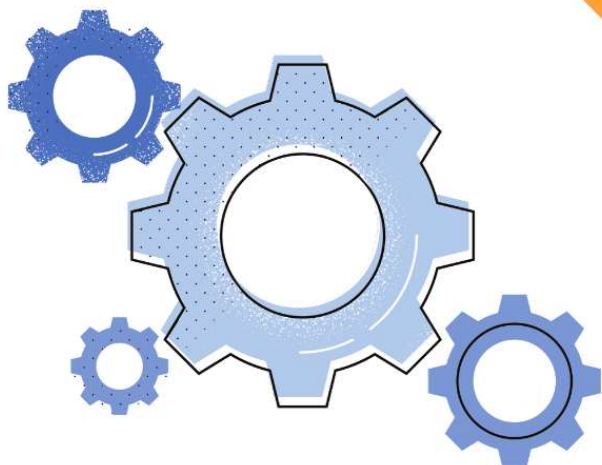
Departmental Newsletter



Volume 1 | Issue 4



Jul - Sep 2026





Vol 1 | Issue 4

CONTENTS

Jul - Sep 2026



IN THIS ISSUE



02

MESSAGE FROM HEAD OF DEPARTMENT

RESEARCH INITIATIVES

03

05

MECH @ ADMINISTRATIVE RESPONSIBILITIES

INTERACTION WITH OUTER WORLD

06

07

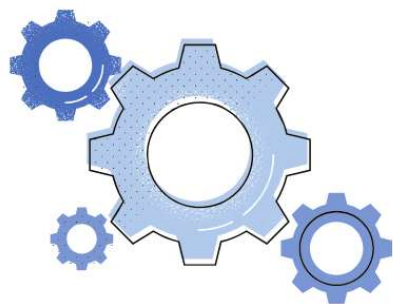
STUDENT'S CLUB

OTHER QUALITATIVE INVOLVEMENTS

08

09

TECHNICAL NOTE



Editors

Dr. Nishit Bedi
Mr. Rehan Khan



On behalf of Mechanical Engineering Department, it gives me immense pleasure to present the last issue of the first year of our departmental newsletter. The progress made by department over the last year can be clearly observed from the cumulative effect of all the past issues. Many activities related to research, academic and administrative as well as other qualitative involvements are also noticeable in this issue too. The feel of enthusiasm and dedication of both faculty and students towards the work was quite wholesome.

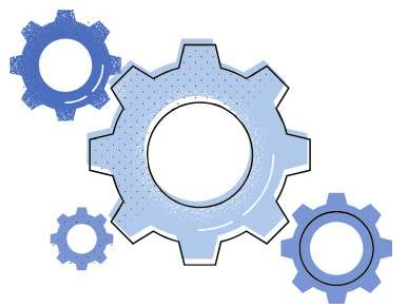


Many decent incidents that occurred at the ground level in the past three months can be observed. I congratulate Dr. V. M. Phalle, Dr. A. V. Deshpande and Dr. N. P. Gulhane that their students successfully completed their doctoral degree defence. Other significant activities such as collaboration between VJTI and University of South Florida under capstone projects along with Change in DAC committee can be noticed in this issue.

I extend my sincere appreciation to everyone who contributed to this edition and look forward to many more successful milestones in the journey ahead.

Enjoy reading!!

Dr. Sachin S. Naik



International Conference on Autonomous Aerial Vehicles 2026



Addressing Class Imbalance in Deep Learning-Based Intrusion Detection for UAV Networks: A Comparative Study with Cross-Dataset Validation

International Conference on Autonomous Aerial Vehicle, Bengaluru, Karnataka, India

Faculty – Dr. Kajal Vinayak, Dr. V. M. Phalle

Student – Shruti Ajay Bhavsar

The work examined deep learning approaches to strengthen UAV network security as well as tackling data imbalance through cross-dataset validation. This will be published as lecture notes in Mechanical Engineering.

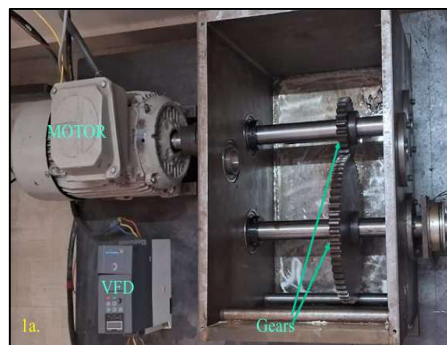
PhD Final Defence during the quarter

Gearbox Fault Detection and Severity Analysis by Machine Learning Approach

Supervisor – Dr. V. M. Phalle

Student – Mr. Ramesh Bhandare

The research focused on the fault diagnosis of a single stage gearbox system with gear and bearing faults. Advanced signal decomposition techniques were employed followed by extraction of statistical features for dynamic characteristics of the machinery.

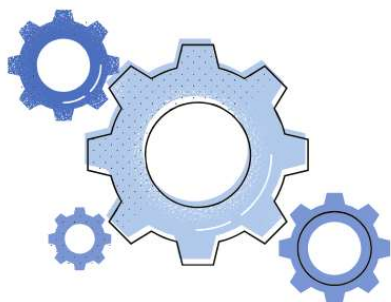


Experimental and Numerical Investigation of Shock wave propagation at small scales

Supervisor –Dr. A. V. Deshpande

Student – Mr. V. Lokhande

The work discussed the investigation about shock propagation at microscale and post-shock flow. A three-dimensional analyses was performed with Navier - Stokes equations and no slip wall boundary condition and was validated with experimental results. A Scilab code is developed and linked with Excel for detection of shockwave and contact surface location.



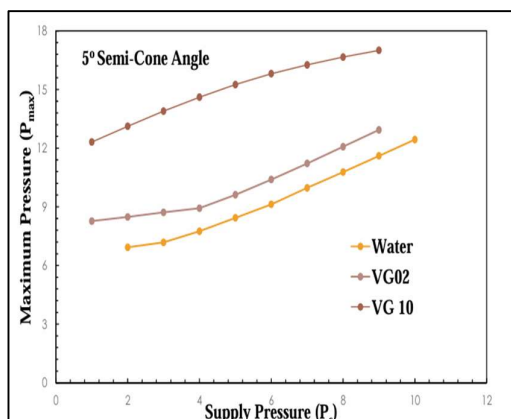
PhD Final Defence during the quarter

An Experimental and Numerical Investigation of Heat Transfer Augmentation under Impingement of Pulsed Jets

Supervisor – Dr. N. P. Gulhane

Student – Mr. Avinash Rathod

A comprehensive analysis identified critical operating parameters defined by Reynolds number, Strouhal number, and nozzle-to-target spacing that were used to maximize thermal efficiency in high-heat flux applications.

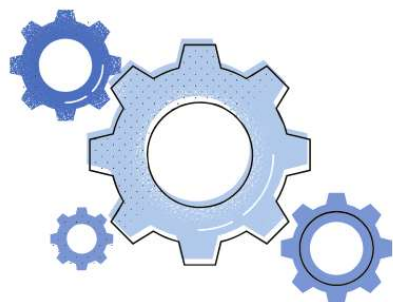


Performance of Conical Fluid Film Journal Bearing in Turbulent Flow Regime

Supervisor – Dr. V. M. Phalle

Student – Mr. Prasad V. Kulkarni

The conical bearings are generally used in precision machine tool such as grinding machines. The main advantage is to support loads in the axial as well as in the radial direction. In this work, CFD analysis was carried to study the effect of Aspect ratio, semi cone angle, supply pressure, eccentricity ratio and Reynolds number on pressure distribution of conical hydrodynamic journal bearing using water and oil as fluid.





Dr. W. S. Rathod, Associate Professor, Mechanical Engineering Department became Dean, Faculty Affairs in the second week of July 2026 for the period of two years. Previously, he used to be Associate Dean, Infrastructure and was observed to be deeply involved in his role.

Dr. V. B. Suryawanshi, Assistant Professor, Mechanical Engineering Department became Associate dean, Faculty Affairs in the second week of July 2026 for the period of two years. Previously, he used to be Rector for Boy's Hostel and was greatly acknowledged by the competent authority.



Dr. M. V. Tendolkar, Assistant Professor, Mechanical Engineering Department became Associate dean, Student Activities in the second week of July 2026 for the period of two years.

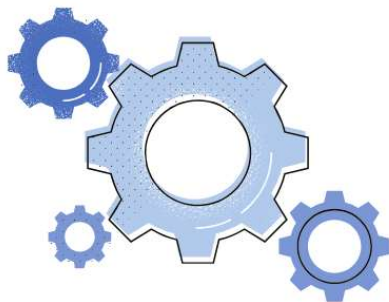
Dr. S.S. Barve, Assistant Professor, Mechanical Engineering Department became Associate dean, Faculty Affairs in the second week of July 2026 for the period of two years. He is also faculty incharge for Aero VJTI, a student's club that is involved deeply in detailed engineering analysis related to aircrafts.



Congratulations...

from

Mechanical Engineering Department



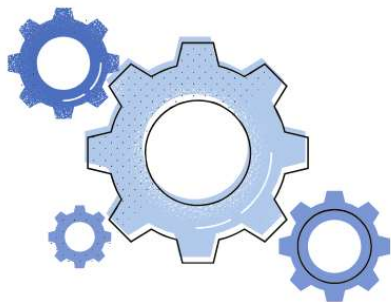


We are glad to share that Dr. V. M. Phalle and Dr. N. P. Gulhane were presented prestigious Dr. J B Naik award from the Govt. of Maharashtra. Dr. V. M. Phalle was awarded for the year 2025, whereas Dr. N. P. Gulhane won the award for the year 2026. The candidature for the award is considered on the basis of contribution towards development to the institute and society.

An online meeting between faculty of Mechanical Engineering Department and Professor Rajiv Dubey & Dr. Drishti Shetty from University of South Florida was held on 04th August 2026. The meeting went for about an hour and was aimed at discussion about international exchange of students between the institutes under USF- VJTI international capstone projects. Director, Dr. Sachin Kore, also attended that meeting and observed the progress.



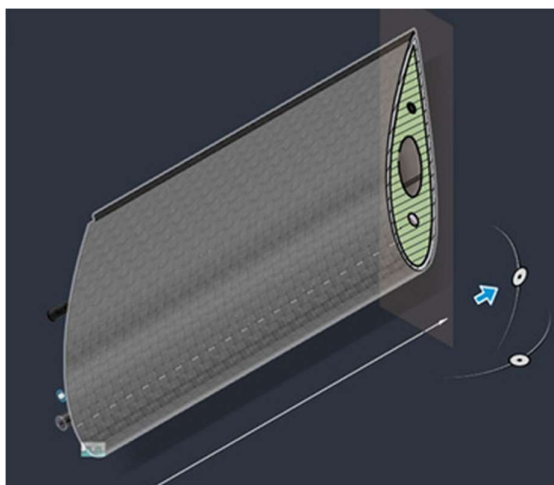
Dr. R. K. Pant, Professor, Aerospace Engineering Department visited VJTI as an expert for the progress seminar for PhD candidates. He also delivered an invited talk on 'Sustainable aviation in Aerospace Engineering' on 07th August 2026. While addressing third year students, the talk initiated with basic theme of 'Why Research' and revolved around strategy for sustainable development.



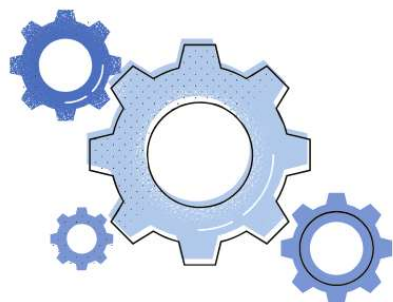
Aero VJTI

Aero VJTI has made significant progress in terms of research, manufacturing infrastructure, skill development, and project execution.

The club has recently cleared the stage of conceptual design in an AIAA D/B/F competition. Recently, a month ago, A Bambu Lab A1 3D printer has been procured for the club. The printer provides features such as automatic calibration, 500 mm/s printing speed, a $256 \times 256 \times 256$ mm build volume, and compatibility with materials including PLA, PETG, TPU, and PVA. The printer will be used for fabrication of components, composite mould development, and iterative testing of designs. This will reduce the dependence on external manufacturing and enabling faster design iterations.



Procurement has been completed for the club's first foam core carbon fiber sandwich prototype. This prototype will help to optimize the composite fabrication process before full-scale implementation. Thus substantial progress in computational design, manufacturing capability, and experimental infrastructure can be noticed. These developments reflect the club's commitment to build strong engineering expertise while creating the facilities and processes required for competitive aerospace project developments.





FDP on “Autodesk Fusion 360 Fundamentals”

A One-Week Faculty Development Programme (FDP) on “Autodesk Fusion 360 Fundamentals” was organized by Mechanical Engineering Department and Production Engineering Department. The 5 day event ranged from 7th to 11th September 2026 and was coordinated by Dr. V B Suryawanshi, Dr. Mugdha Dongre and Dr. Anuprita Bhosale. The program aim was to provide hands-on exposure to modern digital design and to empower educators with the skills to effectively use, teach, and implement integrated 3D CAD/CAM workflows.

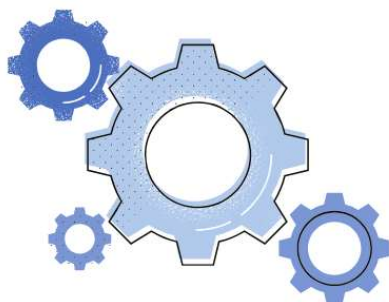
Orientation Program 2026

Orientation program for newly admitted first year students was conducted at Sri Shanmukhananda Chandrasekarendra Saraswathi Auditorium in September 2026. The program spanned for three days that aimed to welcome new students and get them familiar with the rules and regulation of the institute. In addition, some activities related to working culture of the organization as well as their familiarity with engineering education was also involved.



Departmental Academic Committee (DAC) 2026

The Departmental Academic Committee (DAC) is usually constituted for the period of one year or so. In this context, the DAC was reformed on 08th October 2026. Dr. R. M. Tayade and Dr. S. S. Barve were added in place of Dr. A. V. Deshpande and Dr. V. M. Phalle. On the other hand, Dr. S. S. Naik and Dr. M. V. Tendolkar will continue to be member of DAC committee.

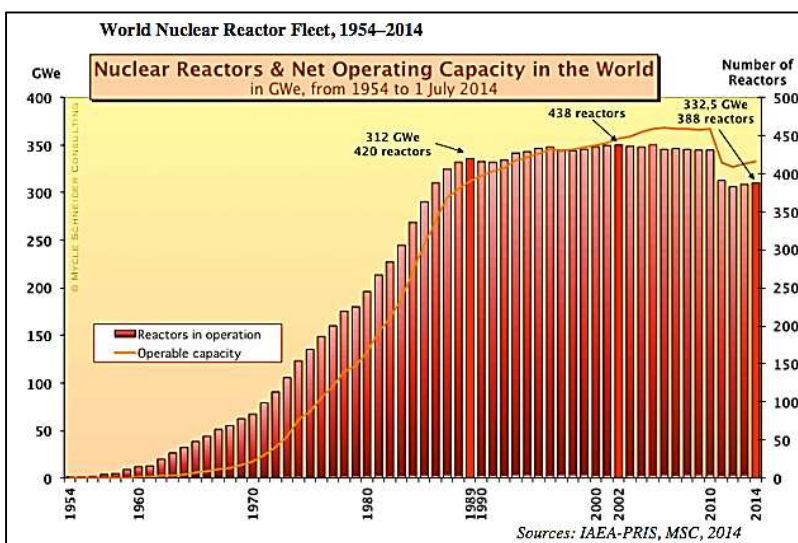




Advent of Small Modular Reactor (SMR)

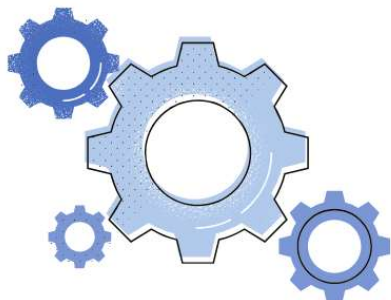
Dr. A. Rama Rao & Dr. S. S. Naik, HOD, Mechanical Engineering Department, VJTI

SMR has become a buzzword today spoken and debated by all and every one related with climate change, carbon footprint, global warming and big business houses. This certainly indicates that both environment and economics are under threat. If one sees the historical trend of nuclear energy in the world, the best phase was between 1970 and 1990 when nearly 300 nuclear plants were built mostly in Europe, Japan, Canada and USA. These reactors contributed about 360 GWe. Most of those reactors belong to Generation II. See figure below. Today, if they have to be built, it will need to conform to either Generation III or III+ reactors with advanced feature and several passive systems in the design.



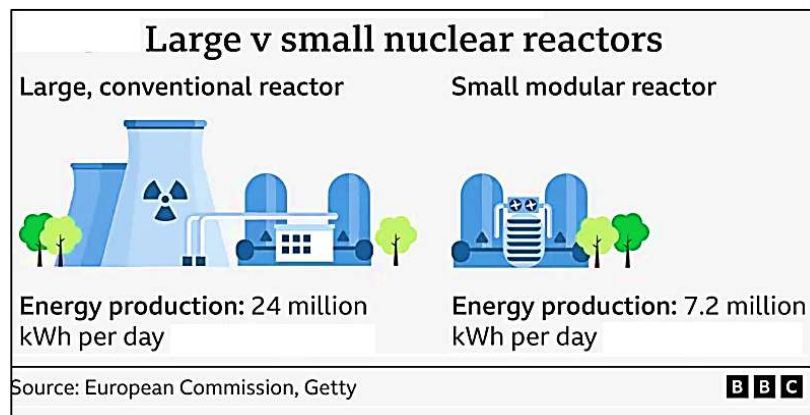
All of us must rise to the occasion and help to mitigate the crisis of climate change. The time is to look for best possible clean energy mix for the generation to sustain and grow. If the contradiction between growth and carbon emission has to be countered, today the choice is limited. A complementary role between nuclear and renewable is the best option to meet the targets set for 2030, 2047 and 2070.

Economics of scale is based on maximizing megawatts against operating and maintenance (O&M) costs. This drove nuclear to produce larger designs, leading to designs of today with power levels of up to 1700 MWe. Interest in reducing plant O&M costs led to the development of passive safety features that are adopted in Generation III and III+ reactors. After this there was little that could be done to make them more efficient. However, the market for large capacity power plants is limited to countries with a large grid capacity. China is churning out large nuclear reactors. Construction started on six new reactors there in 2025, and two more got underway in the first five months of 2026. The country is on course to overtake both the US and the European Union in installed nuclear capacity by 2030. However, in recent times there are significant political risk, public controversy, lengthened licensing procedures, and risk of governments imposing nuclear phase out, etc.





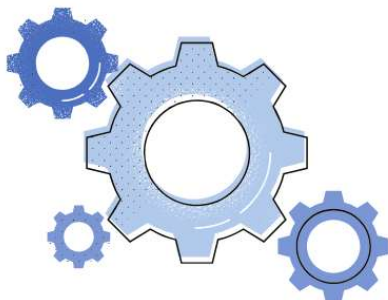
Limitations of grid capacity and slow growth in power demand were leading factors in exploring whether smaller, more incremental nuclear power technologies can be built that can be used either instead of new large nuclear power plants, or to supplement existing installed capacity. In addition, with the growing use of intermittent renewable capacity such as solar, wind, small hydroelectric and tidal generation, there are advantages in introducing small base load nuclear plants with enhanced load-following capabilities to stabilize the grid. Nuclear industry recognized this gap in the market and responded with smaller reactor facility concepts that promised to meet the long term needs of power utilities. Figure below shows schematic of large and small capacity nuclear plants



The market for smaller nuclear facilities has the potential to be an order of magnitude larger than for current full scale nuclear power plants, given that most small countries either have small grids or are developing mixed generation grids. However, much of the infrastructure essential for larger plants is still needed for these smaller types of facilities, although scaled commensurate with risk. These include the regulatory regime; emergency planning; and security and safeguards.

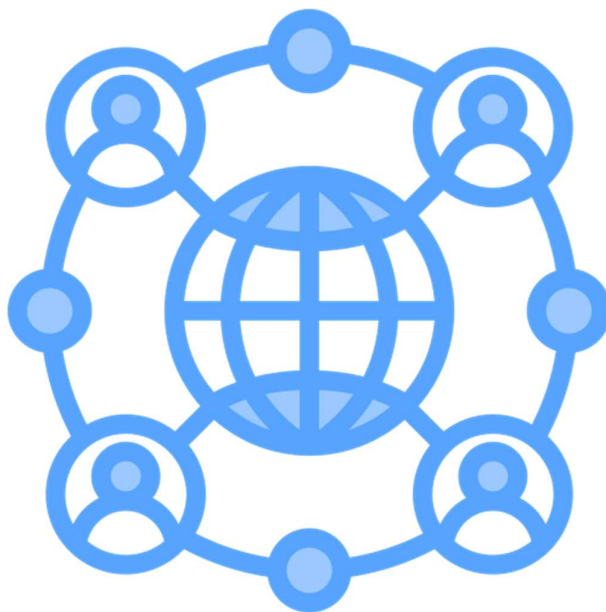
The main driving force to develop SMR is

1. Meeting the need for flexible power generation for a wider range of users and applications.
2. Replacing existing ageing fossil fuel fired power plants or enhancing a grid which contains more intermittent renewables.
3. Enhancing safety performance through inherent and passive safety features.
4. Offering possibilities for synergetic energy systems that combine nuclear and alternative energy sources.





Stay connected with us



Stay in touch with us for the latest updates on research, events, and achievements in in our department.

Connect us at

 <https://vjti.ac.in/mechanical-engineering>

 hod_degree@me.vjti.ac.in

 Ext 531

