Pimpri Chinchwad Education Trust's

Pimpri Chinchwad College of Engineering & Research

Department of Mechanical Engineering

E-MAGAZINE

Academic Year: 2024-2025 **Sem-2**

DIVE INTO THE TREASURE OF ART AND ACADEMICS.

ABOUT TRUST

Pimpri Chinchwad Education Trust (PCET) was established in 1990 by visionary Late. Shri. Shankarrao B. Patil, Late. Smt. Lilatai Shankarrao Patil, Shri. Dnyaneswar P. Landage, Shri. Vitthal S. Kalbhor, Shri. Shantaram D. Garade, Late. Shri. Bhaijan Kazi with an idea of providing quality education from K.G. to P.G. Its sole mission was aimed at serving society, the industry and all stakeholders through value-inculcating, quality education in the area of schooling, as well as professional tutelage in the fields of engineering, management and computer applications.

PCET has always been committed to its mission by creating, communicating, preserving and applying knowledge, art and academic values.

At the campus at Akurdi, Pune, near 7,200 students are being groomed in specialised courses like Engineering, MBA, MCA & PGDM by professional and passionate instructors. The campuses at Ravet are school to 1,200 would-be graduates at the College of Engineering, around 800 pupils at the Junior College, and approximately 2,500 students at the Public School, all amounting to a total of 11,700-odd students

Our Inspiration

Late shri. Shankarrao B Patil
Founder President
Pimpri Chincwad Education Trust

Late Smt Lilatai Shankarrao Patil
Ex President
Pimpri Chincwad Education Trust

Board of Trusties

Shri. Dnyaneshwar P. Landge
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Shri. Shantaram D. Garade
Treasurer, PCET

Shri. Harshwardhan S. Patil
Trustee, PCET

Dr. Girish Desai
Executive Director, PCET

Principal's Desk

At the very outset, I extend a very warm welcome to all of you! It is indeed an honor and pleasure as the principal, to introduce you to Pimpri Chinchwad Education Trust's (PCET's) Pimpri Chinchwad College of Engineering & Research (PCCOER). Established in the year 2014, PCCOER has made an incredible progress in academics, research and placements in a very short period of time and has made its presence felt vividly in the educational circles of not only the University but of the entire State. I attribute this remarkable success to the tremendous efforts of faculty and students of the Institute and to the strong and continuous guidance, motivation and support from PCET.

Young friends, India today stands as the world's third largest economic power, its economy growing at around 8%. Indian entrepreneurs are emerging as global entrepreneurs. Indians are increasingly appearing in the list of the richest persons in the world. India's knowledge, skills and man-power are making India a preferred destination for outsourcing service needs. India is fast emerging as a hub for world class R&D and Innovation Centers. These are the signs of a brighter

tomorrow for India and its citizens. You must, therefore, be highly excited to make your own contributions to the growth and development of your dream India.

As an Engineering Institute, we are committed to contribute to the overall growth of the Nation by providing Outcome Based Education (OBE) to our students. We, at PCCOER, endeavor for an overall development in you, while academic excellence remains to be our strong fort. The spectrum of social, cultural, co-curricular and extra-curricular events at PCCOER is as intellectually stimulating, as is overwhelming! We do not turn you into book-worms or scholarly puppets but into competent professionals and genuine humans. At PCCOER, we have a tradition of nurturing leadership qualities, along with developing abilities to comprehend the state of art technologies. This we do by inspiring you to partake in a whole lot of innovative projects, being pursued by the inspired student's community, under the guidance of their faculty mentors. We let you empower yourself with the Wings of Knowledge and Power of Innovation. We imbibe in you a positive attitude and proactive thinking, a caring concern for humanity and nature and above all, an eagerness to serve and excel in your chosen domain. You come here with a passion; we convert that passion into your profession. Life in PCCOER and I am sure that you will enhance the pride and prestige of this illustrious Institution by giving your best and achieving your best! And my dear faculty and students members, we together have to play our role in Nation building by contributing wholeheartedly towards academics, research and innovation, a gigantic task which, I am observing, you are succeeding in competently, skillfully and effortlessly.

Prof. Dr. Harish U. Tiwari,
ME (IITR), PhD. (Mech),
Principal,
PCCOE&R, Ravet, Pune.

HOD’s Desk

A hearty welcome to the Department of Mechanical Engineering at Pimpri Chinchwad College of Engineering and Research (PCCOE&R), Ravet, Pune.. The department's vision is to be a premier department of Mechanical Engineering and research to serve the needs of the society and all the stakeholders. The Department is student centric and focused for overall development of students in the context of new emerging trends in the market and making the students competitive and strongly equipped with the various technical and professional skills. Different programs like Industrial Training program, Aptitude Training Program, SAE BAJA, SUPRA, TIFAN and Go-Cart activities are planned to equip the students to enhance their technical and professional competence and make them more industry oriented and employable.

The placements in the department are one of the best in the PCMC area. The Industry sponsored laboratories, Internships, experts sessions, Industry sponsored projects, communication skills and soft skills sessions, foreign languages, add on

and value added courses are designed and executed so that students are not only market ready but also well trained for higher studies, entrepreneurship and startups. The department provides much needed support to the students' projects having potential for innovation and startups as well as innovations and startups having innovative ideas. We have been able to create quite a good number of startups and entrepreneurs and have been able to build a very good ecosystem.

The department is a leader in the area of IPR viz. Patents and copyrights. More than 100 patents and 75 copyrights have been led in the department out of which two patents have also been granted in the department. The department has modern and well-equipped laboratories for practical training to its students. All the faculty members are well qualified and experienced. We are committed to the pursuit of excellence. It is our goal to address the varying needs of our young students academically, socially, emotionally and by doing so, provide the highest quality educational experience to all and therefore PCCOE&R is one of the best Mechanical engineering colleges. The department has strong association with different professional bodies like ISTE (The Indian Society for Technical). Education, QCFI (Quality Circle Forum of India) ASME (The American Society Of Mechanical Engineers.), VLSI, SAE (Society of Automotive Engineers) and the department also has its own student council named as Mechanical Engineering Student Association (MESA). MESA provides a platform to the departmental students to showcase their technical, social and sports skills in inter-departmental as well as inter-college competitions.

On the closing note, it could be cited that - "Destiny is not a matter of chance, it is a matter of choice; it is not a thing to be waited for, it is a thing to be achieved".

Prof. Dr. Gulab D. Shiraskar,
Associate Professor & Head,
Department of Mechanical Engineering,
PCCOER, Ravet, Pune.

About the Department

Mechanical engineering is one of the broadest engineering disciplines. Mechanical engineers design, develop, build and test. They deal with anything that moves, from components to machines to the human body. Mechanical engineering combines creativity, knowledge and analytical tools to complete the difficult tasks of shaping an idea into reality. Mechanical engineers can look for employment in diverse areas, including manufacturing, aerospace, automotive, biomedical, chemical, computer, communications, nanotechnology, power-generation industries, engineering consultancies, energy utilities. government agencies etc.

A Mechanical Engineer can also pursue his/her carrier in the public sector through competitive exams like UPSC, MPSC, IES. They can have placements in various public sector undertakings like Navratna and Maharatna by scoring excellently in GATE. They are having good placement opportunities in National and Multi-National companies by perusing ME/M.Tech/MS in India and abroad. They can also become job providers themselves by turning into entrepreneurs and starting own startups.

The Mechanical Engineering Department at PCCOER has been established in the year 2014 and since then, has progressed steadily towards excellence. The Department works on Outcome Based Philosophy (OBE), wherein the complete focus of the department is to prepare the students in such a way that he/she is oriented towards acquiring knowledge, skills, hands on training and ICT techniques by using various teaching pedagogies, which will lead them toward better placements, higher education and entrepreneurships. The audits of all these initiatives are conducted on a regular basis and its execution is checked to ensure that students are getting really benefited through the process.

The department runs a UG programme in Mechanical Engineering, which is a 4 years, 8 semester's full time programme. The department has an adequate number of faculty members and supporting staff, who are well qualified, experienced and dedicated. The department has well equipped 16 no. of

state-of-the-art laboratories, specious classrooms, drawing hall, project and innovation center. The department provides the students with a strong fundamental, scientific and technical knowledge-base, multidisciplinary approach and critical thinking skills which serve as the foundation for lifelong learning in Mechanical Engineering. The department motivates and supports the students for Industry Sponsored Projects and Industrial Training so that they are well acquainted with the industrial problems and its solutions to be better prepared for the industries. The department also emphasizes on inculcating, professionalism, ethics and true attitude in the students. It also puts more efforts on strengthening communication skills, team work and social awareness among the students.

Magazine Coordinators:

Prof. Deepak Biradar
Faculty Co-ordinator

Nishant Sasane
Editor

Utkarsh Raut
Editor

Piyush Shelar
Editor

Gajanan Chavan
Editor

★ Vision of the Department:

To be a Premier Department of Mechanical Engineering and research to serve the needs of the society and all the stakeholders.

★ Mission of the Department:

M1: To provide state of art facilities to impart quality education.

M2: To undertake various value added and add on courses to make students technically sound and thorough professionals.

M3: To collaborate with the industries and academia and strive to transform the research and innovative aptitude in the students and faculties.

M4: To inculcate high moral, ethical values and national pride in students and faculties.

★ Programme Educational Objectives of the Department

PEO1: To develop well sound students in academic fundamentals to understand, analyze and solve problems related to Mechanical Engineering.

PEO2: To meet the employer's requirements at large and prepare them towards quality higher education and entrepreneurship

PEO3: To build up student's ability to enhance their competence in research and innovation to design product and process

PEO4: To create awareness amid the students about professional ethics, managerial skills, social commitment and lifelong learning.

★ Programme Specific Outcomes of the Department

PSO1: Develop the knowledge and skills relevant to the eld of robotics and automation by undergoing hands-on training.

PSO2: Develop and implement new ideas on product design and development with the help of modern computer aided tools, while ensuring best manufacturing practices.

EOMS Policy

We, at PCCOE&R, are committed to:

- Develop as a premier institute of technical education & research as per the needs and expectations of all stake holders.
- Comply with all applicable requirements.
- Continual improvement in educational, technical and scientific development, infrastructure and management system.
- Social responsibility
- Managing intellectual property

We shall strive to maintain an environment conducive to learning and student's overall development with high moral and ethical values.

List of Teaching Staff

Sr. No.	Name of the Faculty	Designation	University Degree	Experience (Yrs.)	Area of Specialization
01	Dr. Gulab Dattrao Siraskar	Associate Professor	Ph.D.	24	Heat Power
02	Dr. Ramesh Kishanrao Rathod	Associate Professor	Ph.D.	26	Thermal Engg
03	Dr. Sham Harikrushna Mankar	Associate Professor	Ph.D	23	Mech. Engg.
04	Dr Rahul Krishnaji Bawane	Assistant Professor	Ph.D.	16	Heat Power
05	Dr Ms. Rupali Manoj Patil	Assistant Professor	Ph.D.	06	Heat Power
06	Mr. Deepak Devidas Biradar	Assistant Professor	ME/MTech PhD perusing	16	Heat Power
07	Ms. Jayashri Vitthal Chopade	Assistant Professor	ME/MTech PhD perusing	13	CAD/CAM
08	Mr. Sukhadip Mhankali Chougule	Assistant Professor	ME/MTech PhD perusing	9.6	Design
09	Mr. Achyut Digambar Khare	Assistant Professor	ME/MTech PhD perusing	32	CAD/CAM
10	Mr. Ganesh Mahadev Fodase	Assistant Professor	ME/MTech PhD perusing	13	Design

11	Mr. Sanjay Mallikarjun Narayankar	Assistant Professor	ME/MTech PhD perusing	16	Design
12	Mr. Prashant R. Mahale	Assistant Professor	ME/MTech	20	Design
13	Mr. CHAUDHARI SUJIT BADASHAHA	Assistant Professor	ME/MTech PhD perusing	10	Design

Teaching Staff Summary

TEACHING FACULTY DETAILS		
Designation	**Qualification**	**No. of Faculty**
Associate Professor	Ph. D.	03
Assistant Professor	Ph.D.	02
	Ph. D. (Pursuing)	07
Assistant Professor	M E	01
Adjunct Faculties		01

Mechanical Engineering Department Higher Studies Data

Sr	Name	Name of the Course	Name of the College / University	Admission Year / Batch
1	Pranav Biradar	MS, in Industrial Engineering	New York University USA	2024-25 (batch 2022-23)
2	Mr. Shriniwas Chandrashekhar Tonape	Master of Science in Mechanics	Technische Universität Darmstadt in German	2024_25 (batch 2022_23)
3	Amaye Mahamuni	M.Sc in Computer Aided Conception and Production in Mechanical Engineering (CAME)	RWTH Aachen University in Germany,	2024_25 (batch 2022_23)
4	Vedant Pagar	M.S. in Mechatronics	Hochschule Ravensburg-Weingarten University Of Applied Sciences in Germany	2024-25 (batch 2022-23)
5	Rajas Patil	MS in Industrial engineering	A&M University Texas, USA	2021-22 batch
6	Shreyash Jagtap	M.S in Robotics and Intelligent Manufacturing	University College Dublin, Ireland	2024-25 (batch 2022-23)
7	Samruddhi	Msc in Business	Southampton University	2024-25

	Sardar	analytics and management sci	UK	(batch 2022-23)
8	Mr. Uddeshya Raj	Master of Science in Business Analytics	Babson College USA	2024-25 (batch 2022-23)
9	Mr. Ayush Chordiya	M.Tech in Industrial Engineering and Operation Research	IIT Bombay	2024-25 (batch 2021-22)
10	Parth Sahastrabuddhe	MS in Computer Science and Engineering, (AI/ML)	State University of New York at Buffalo	2024-25(batch 2019-20)
11	Mr. Himanshu Mahajan	MSc in Advance Composite	University of Bristol, UK	2024_25 (2021-22 batch)
12	Mr. Rishabh Deshkar	M.S. in Mechatronics and Robotics	FH Schmalkalden University of Applied Sciences in Germany.	2024_25 (2020_21 batch)
13	Yash Lohar	M.S. in Mechatronics and Robotics	FH Schmalkalden University of Applied Sciences in Germany.	2024_25 (2022_23 batch)

Mechanical Engineering Department Research and Publications

Sr no	Name of Faculty	Scopus and sci paper published (2024_25)	Any other achievement (special)
1	Dr. SIRASKAR GULAB DATTRAO	05 Papers Published in SCOPUS Indexed Journal	Mondelez - Cadbury training (3 months), Creo Training
2	Dr. RATHOD RAMESH KISHANRAO	Worked as CAP assistant director	
3	Dr. MANKAR SHAM HARIKRUSHNA	02 Papers Published in SCOPUS Indexed Journal	Filed Two Design Patents - 01 Design patent Registered
	Dr. MANKAR SHAM HARIKRUSHNA	Organized TWO Hands-on Three Days Workshops	
4	Dr. BAWANE RAHUL KRISHNAJI	2 papers are Accepted in Scopus Journal	Received AICTE ATAL FDP Grant of Rs. 1 Lakh
	Dr. BAWANE RAHUL KRISHNAJI	Organized 3-days National Level W/s on IPR	Book published on NBA
5	Dr. PATIL RUPALI MANOJ	01 (paper published in Q1 Journal)	organised national level workshop on HVAC
	Dr. PATIL RUPALI MANOJ	organized national level workshop	placement of 2 students through personal connect
6	Mr. BIRADAR DEEPAK DEVIDAS	Developed a new product	Commercialized the newly developed product

7	Mrs.CHOPADE JAYASHRI VITTHAL	Paper published in scopus index journal (Q3) one more Paper presented in International conference	
	Mrs.CHOPADE JAYASHRI VITTHAL	Book published for Engg and MBA students	Book chapter accepted for Scopus index
8	Mr. CHOUGULE SUKHADIP MHANKALI	Paper published in scopus index journal (Q3)	Organised 40 hrs training session on CATIA Basic And Ansys for SE and TE students
9	Mr. FODASE GANESH MAHADEV	02 Papers Published in SCOPUS Indexed Journal	Coordinated EOMS certification and implementation at institute and department level .

3D Printing Workshop

Mr.Ganesh Fodase organised 3-Days Workshop on 3-D Printing

Expert Session by Mr. G. M. Fodase

Prof. G. M. Fodase Delivered a Handson session at Jaihind College of Engineering for Mechanical Engineering Students Date: 07/04/2025

Expert Session by Prof. J. V. Chopade

Expert session delivered on Patent and copyright on 29/1/2025 in D. Y. Patil ACS Pimpri

Paper published in Q1 Journal (Scopus and SCIE indexed)

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Effect of solution annealing on the microstructure, mechanical properties & residual stresses of selective laser melted Inconel 718

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[b] Pimpri Chinchwad College of Engineering & Research, Pune 412101, India
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ARTICLE INFO

Keywords:
Inconel 718
Additive Manufacturing
Selective Laser Melting
Solution Annealing and Double Ageing

ABSTRACT

This study establishes how solution-annealing parameters govern microstructure, tensile response and residual stresses in SLM Inconel 718 under a fixed two-step ageing schedule. A Taguchi L9 design varied heating rate (12–20 °C/min), anneal temperature (950/980/1010 °C) and hold (1–3 h); tensile, hardness, microscopy and XRD were integrated to map process–structure–property linkages. Annealing temperature was dominant: 1010 °C–3 h–12 °C/min achieved UTS 1461 MPa, YS 977 MPa, elongation 17.0 % and ~48.2 HRC, coincident with minimal detectable boundary films, extensive equiaxed recrystallization and reduced grain aspect ratio that collectively maximize coherent precipitation during ageing. Residual stresses were markedly relieved, with components reversing from tensile in the as-built condition toward compressive after heat treatment, consistent with $\sin^2\psi$ analyses. The results clarify how time–temperature–ramp history through the 650–980 °C kinetic window and solution annealing across the δ-solvus (1010 °C for LPBF IN718) govern boundary-network breakup, recrystallization/twinning, Nb availability for precipitation and residual-stress reversal, providing actionable heat-treatment guidance for SLM IN718.

1. Introduction

Additive Manufacturing (AM) enables the production of geometrically complex and lightweight components with high material efficiency. Selective Laser Melting (SLM), a powder bed fusion process, constructs metallic parts by selectively melting discretised CAD layers using a high-energy laser [1]. The global AM sector has rapidly transitioned from prototyping to industrial-scale production, driven by its alignment with Industry 4.0 principles such as automation and digital integration [2]. Among AM techniques, SLM is particularly valued for producing near fully dense, fine-grained metallic components under inert atmospheres [3]. Inconel 718, a precipitation-strengthened nickel-based superalloy, is widely used in aerospace and energy applications due to its high strength, fatigue resistance and corrosion stability [4,5]. However, the steep thermal gradients in SLM introduce microstructural heterogeneity, anisotropy and residual stresses approaching yield strength, especially along the build direction [6]. Although optimized parameters reduce porosity, they may simultaneously amplify thermal stress accumulation and compromise surface integrity [6,7].

Selective laser melting (SLM) of Inconel 718 produces a nonequilibrium cellular–dendritic microstructure with interdendritic Laves phase and high residual stresses, making post-heat treatments essential to recover ductility and stabilize properties [8]. Solution annealing (SA) homogenizes segregation, dissolves Laves/δ, relieves stresses and promotes recrystallization; subsequent double ageing is then required to precipitate coherent γ″ (Ni_3Nb) and γ′, which govern room- and intermediate-temperature strength in 718 [9,10]. Critically, the seminal double-ageing work by Wang established the optimized two-step sequence (≈720 °C/8 h + 620 °C/8 h) that maximizes γ″/γ′ while suppressing detrimental δ, codifying why double ageing should follow SA in 718 [11].

The chosen SA temperatures (950, 980 and 1010 °C) sample sub- and near-solvus conditions for LPBF IN718, where the δ-solvus is 1010 °C; δ can thus be retained below the solvus for grain-boundary pinning or dissolved at the solvus to promote equiaxed, twin-rich recrystallization prior to ageing [12–14]. At ~950–980 °C, δ stabilizes boundaries and

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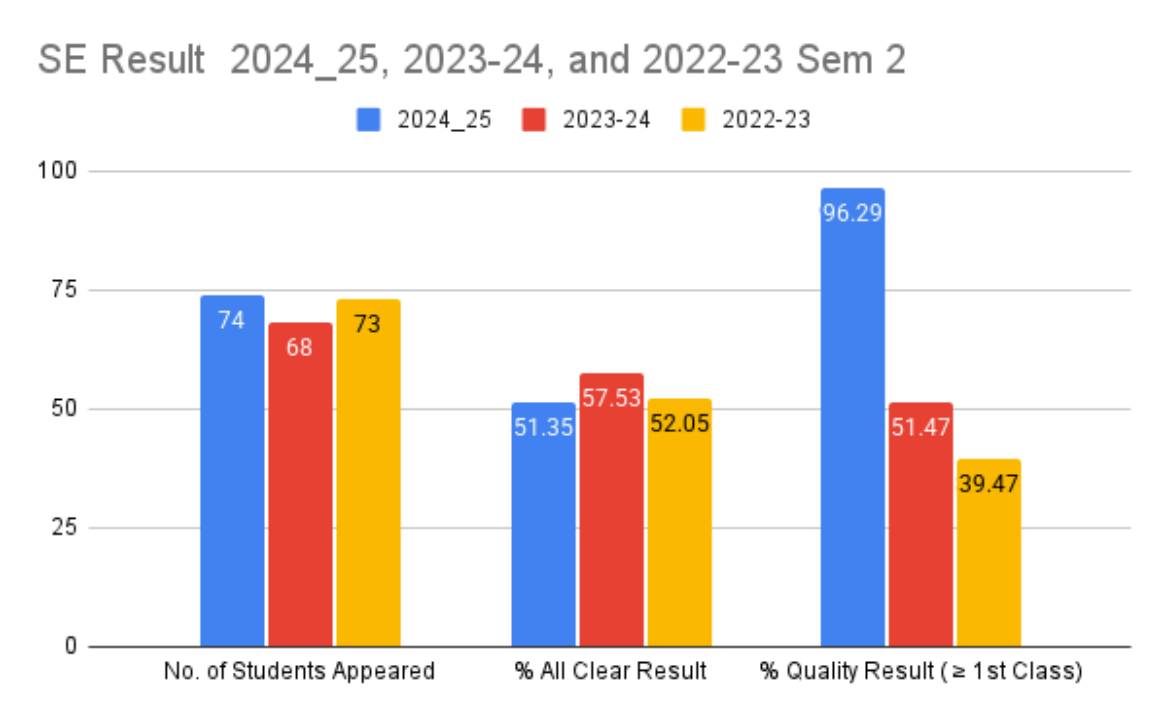
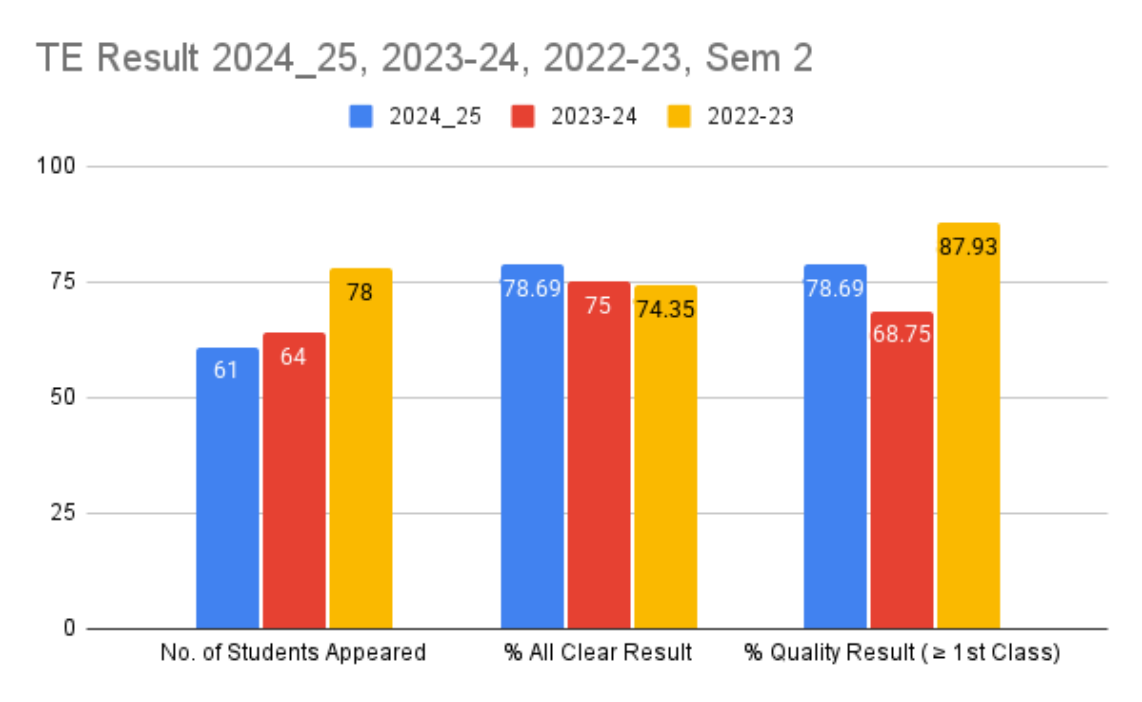
Research Article published in the Journal of Alloys and Compounds on 28 October 2025

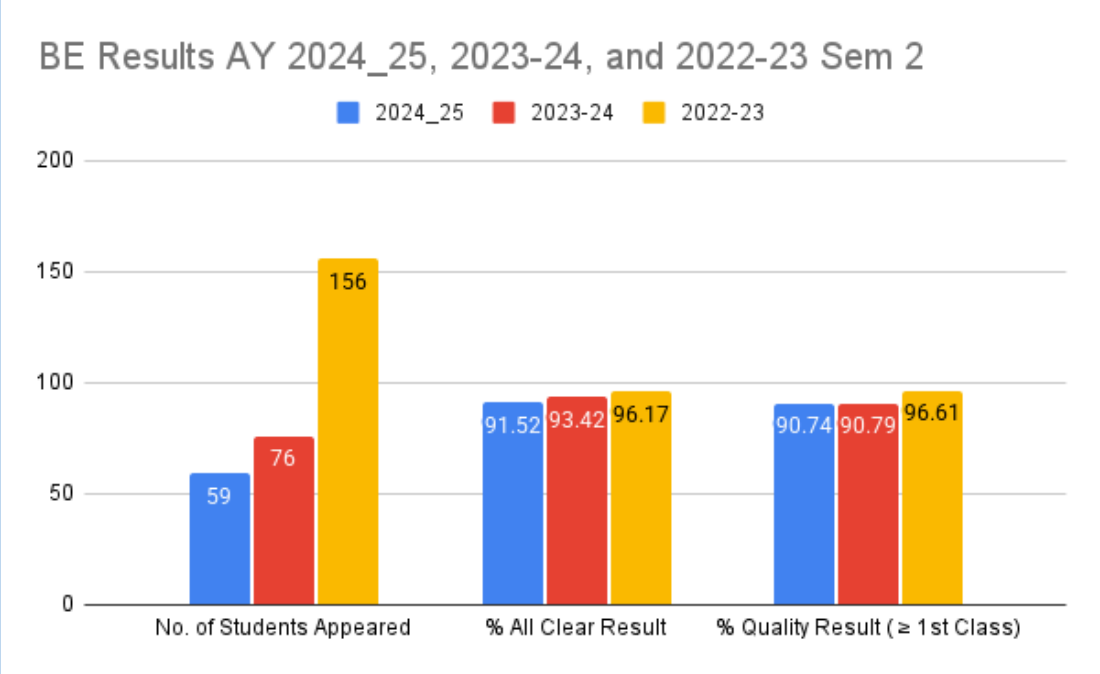
Department Result Analysis



TE Result Analysis

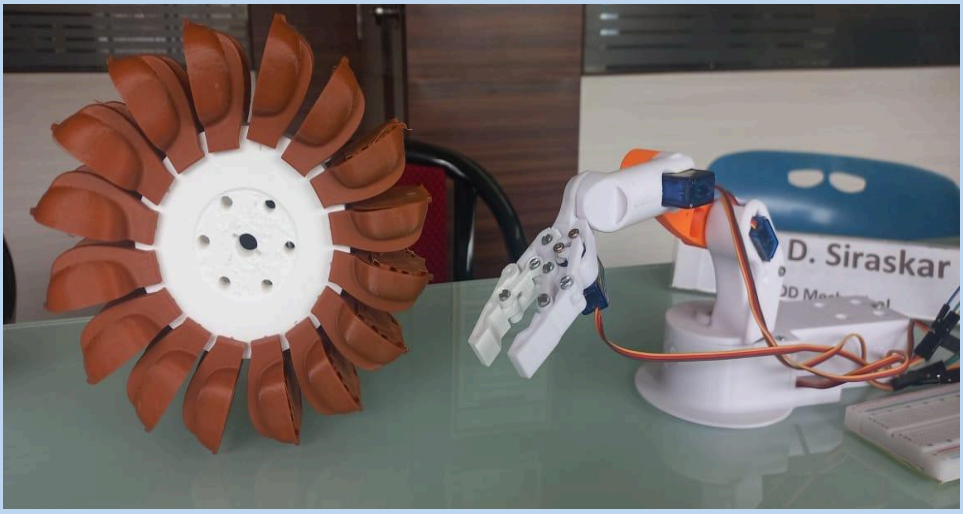


BE Result Analysis



Products Developed

EV Bike Project mechanical engineering department 2024-2025

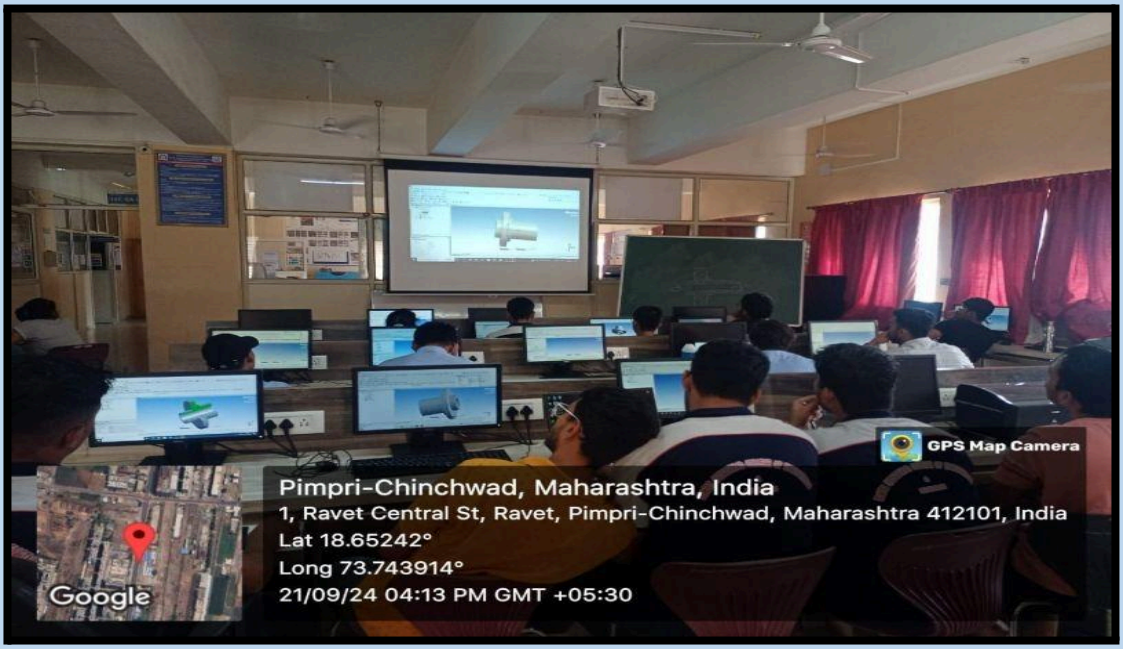


Working Robo arm and Pelton wheel SE Students project 2024_25

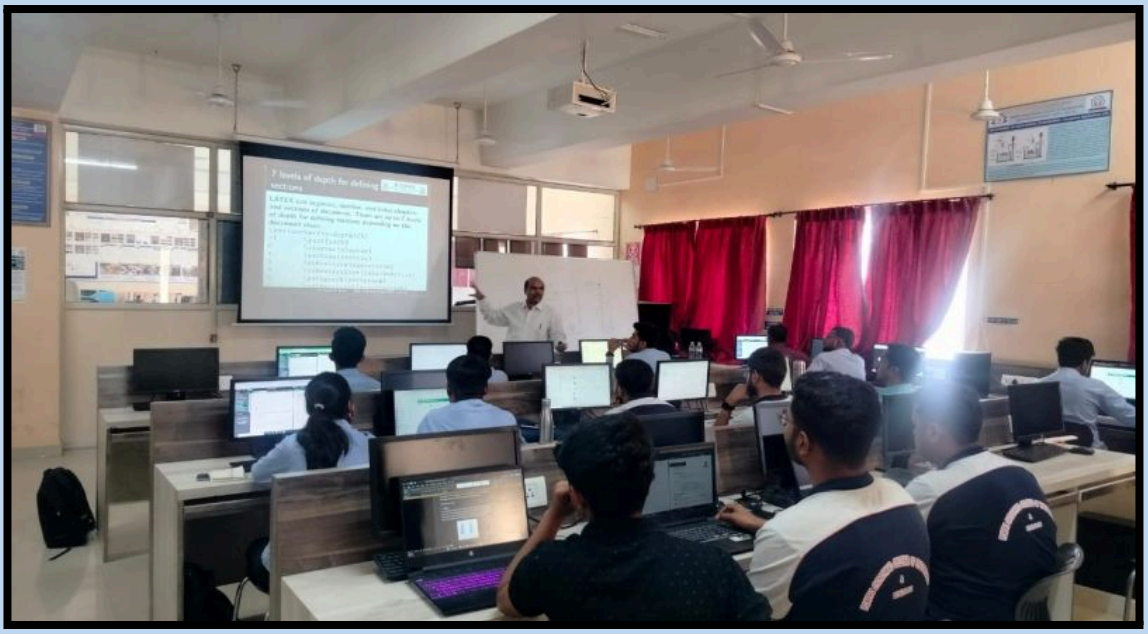
Departmental Activities

Dr. Sudarshan Kumar, IIT Mumbai, accepted to be board of studies (BOS) member of Mechanical Engineering Department, PCCOER

Departmental Activities

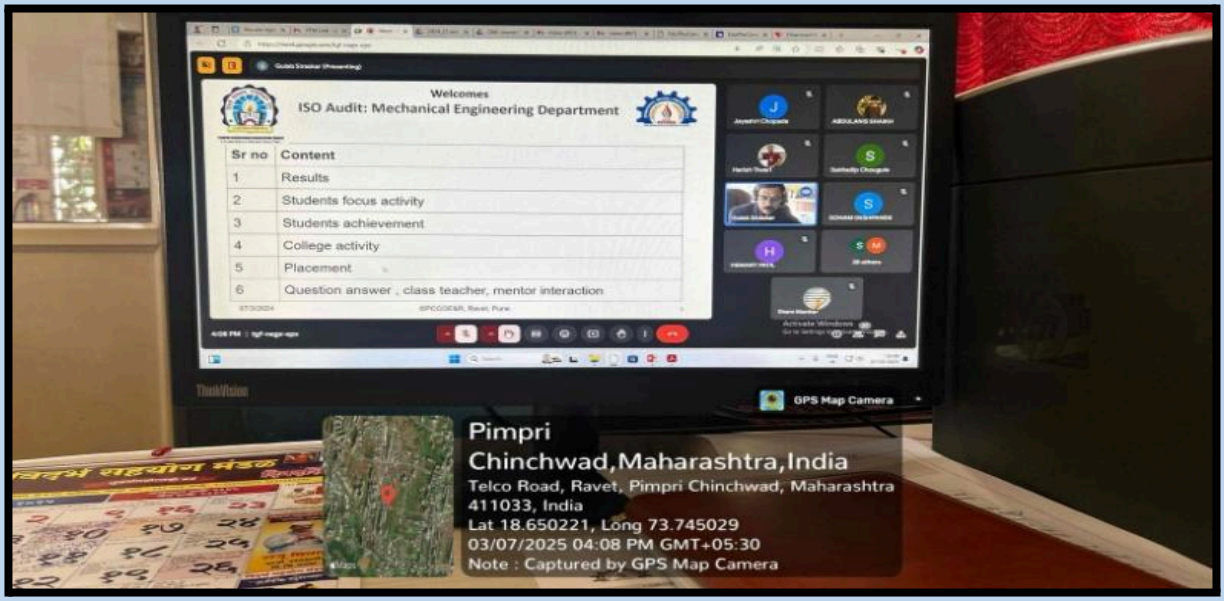


Ansys Session for TE Mechanical students on 07/03/2025



Latex workshop for BE students 28/03/2025

Departmental Activities



Parent-teacher meet Mechanical Engineering department 07/03/2025

MOU Signed between PCCOER and Megaverse Technologies Pvt Ltd, mechanical Engineering department.

Departmental Activities

MOU Signed between PCCOER and Auto Cluster Development & Research Institute, Chinchwad, Pune.

Department of Mechanical Engineering Students Achievements

Congratulation !! to Miss. Prachi Pilwalkar for getting admission for the **M.S. in Smart connected and Autonomous Vehicle, in Warwick University, UK**

Miss. Prachi Pilwalkar

Mechanical Engineering Department (2023 batch)

WARWICK
THE UNIVERSITY OF WARWICK

Department of Mechanical Engineering Students Achievements

Congratulation !! to Mr. Shlok Ashtekar for getting admission for the M.S. at Purdue University, Indiana, USA

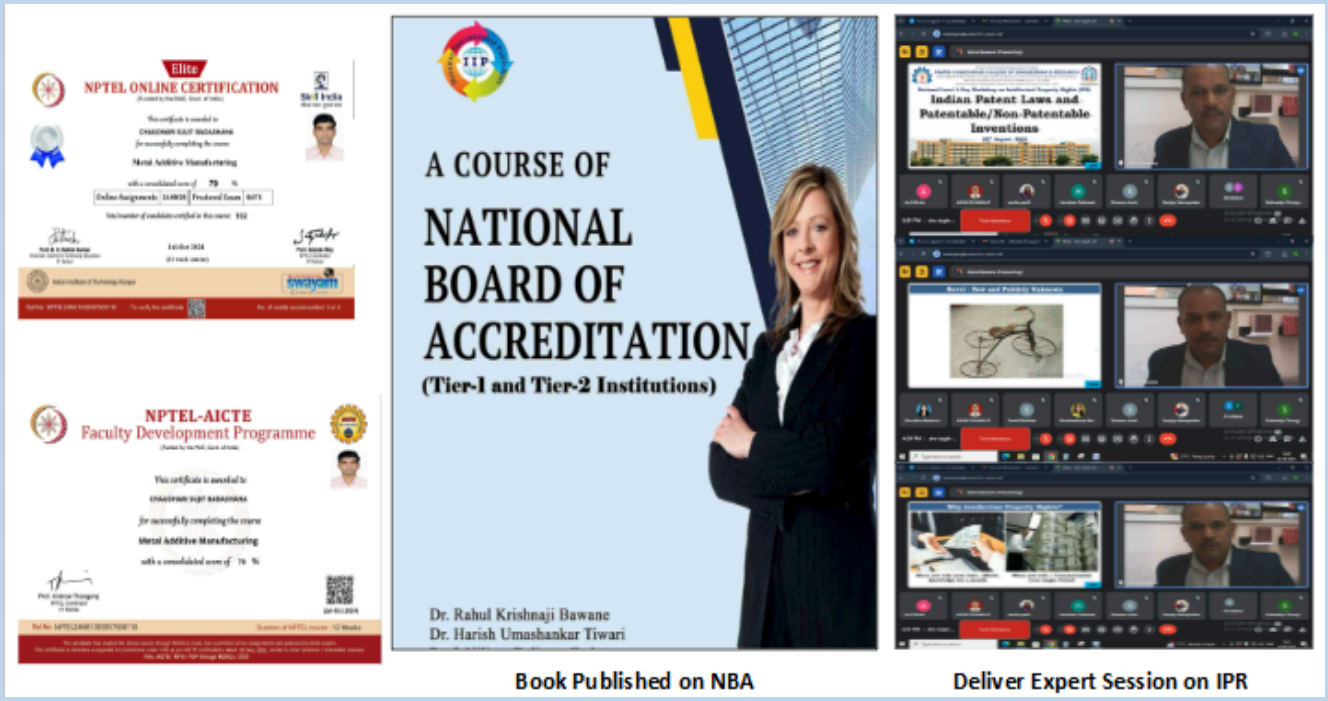
Mr. Shlok Ashtekar

Mechanical Engineering Department (2023 batch)

PURDUE UNIVERSITY

Department of Mechanical Engineering Faculty Achievements

1. Prof. J. V. Chopade file 1 design patent.
2. Prof. J. V. Chopade filed 2 copyrights on research work.
3. Prof.G. M. Fodase published 1 research paper in Scopus Index journal
4. Prof. Dr. Sham H. Mankar Published 02 Research Papers (01 in Springer Q2 Journal and 01 in Scopus Indexed Journal).
5. Mr. Deepak Biradar filed 1 patent.
6. Mr. Deepak Biradar filed 2 copyrights on the newly developed product.



Book Published on NBA

Deliver Expert Session on IPR

Published by:

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