



## Preventive and Predictive Maintenance

Become a Super Specialist of Plant Maintenance Management Systems.

**EXCLUSIVE INDUSTRY BASED  
"ONE YEAR POST GRADUATE DIPLOMA COURSE"  
FOR INDUSTRY PROFESSIONALS & ENGINEERING  
STUDENTS APPROVED BY ADITYA UNIVERSITY  
ACCREDITED BY NBA AND NAAC WITH A++**

12 MONTHS | BLENDED | ONLINE | WEEKEND LEARNING

MUNJAL GROUP, ICME & ADITYA UNIVERSITY INITIATIVE

## Director's Message

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**Gaurav Munjal**  
**Director, EdutechNest**

Dear Colleagues,

It is with great pleasure that I share the launch of our one-year online Post-Graduate Diploma Programs at EdutechNest, an initiative by the Munjal Group and Indian Centre for Research and Manufacturing Excellence (ICME). These programs have been carefully designed to address the evolving needs of industry professionals and engineering students, equipping them with the necessary skills and knowledge to excel in their respective domains.

In today's dynamic environment, continuous learning is imperative. Our diplomas serve as conduits between academic theory and industrial practice, perfect for professionals aiming to upgrade their skills or students stepping into the professional realm.

Our advantage lies in our commitment to quality and forward-thinking. In partnership with industry leaders and esteemed academics, we have crafted a curriculum that is relevant today and adaptable for tomorrow. Our courses cover the latest in technology and industry developments, ensuring you are well-prepared for the future.

We recognize the importance of flexible learning. Our programs offer a mix of online classes, interactive workshops, and practical projects, allowing you to learn without compromising your work or personal life. Our faculty is committed to guiding you at every stage.

As we embark on this exciting journey, I am confident that our programs will be instrumental in your growth. EdutechNest is here to support your career goals or personal passions.

I extend my heartfelt gratitude to our esteemed partners, faculty members, and students for their unwavering support and enthusiasm. Together, let us chart a course toward a brighter future filled with boundless opportunities.



**A D I T Y A**  
UNIVERSITY

## Aditya University Pro- Chancellor Message



**Dr. N. Satish Reddy**  
**Pro- Chancellor**  
**Aditya University**

Dear Colleagues,

Being a direct descendant of Aditya, I am cognizant of the arduous efforts my father exerted to establish Aditya on the academic landscape of the nation during its numerous expansion phases, despite the most trying circumstances.

Having earned my master's degree from UTS Australia, the preeminent institution on the continent, I now have a more profound comprehension and discernment of the education system. This, in conjunction with my father's ideology, empowered me to assume the responsibility of guiding Aditya.

Founded on the tenets of quality and excellence, Aditya University (formerly known as Aditya Engineering College), Surampalem provides professional education in the fields of engineering, technology, management, and pharmacy.

The campus has come a long way since its 2001 founding thanks to its steadfast dedication to educating students in science and technology and enriching human knowledge. The primary objective of the institution is to ensure that academic pursuits have real-world applications.

Aspiring students can find a wealth of resources on campus that will serve as a solid foundation for their future careers in business. With its many programmes, T-Hub exemplifies the boundless possibilities available to students today, including internships on campus, opportunities to build partnerships with corporate and industry giants, and the competitive inputs necessary to become T-shaped engineers.

Making the campus the "first stop" for companies in recruiting is Aditya's ultimate goal. Because of this, the training and placement cell is very careful to mould students into workers that meet the demands of the market.

We place a lot of focus on students' overall personal development because we know that the demands of the workplace go beyond rote memorization and grades. Many student-run organizations and annual events, such as VEDA (the technical fest) and COLOURS (the youth fest), serve to foster and showcase students' hidden talents.

Finally, a desire can change nothing, a decision can change something, but a determination can change everything. For sure Aditya is strongly determined to provide its students a successful career. Wish you good luck.

## Director's Message

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**Ravinder Kumar**  
**Director, EdutechNest**

Dear Colleagues,

We're thrilled to announce the inauguration of our one-year online Post-Graduate Diploma Programs at EdutechNest, a pioneering venture brought to you by the esteemed collaboration of the Munjal Group and the Indian Centre for Research and Manufacturing Excellence (ICME).

Globalization of the markets has put great Competitive pressure on the Manufacturing and Service Industry. The key to sustained economic success in Today's VUCA World will be consistent upgradation of Skills & Capabilities at the Individual Level and Organizational level. Though the Indian Government is emphasizing 'Make in India', at the same time the Skill gap between Industry Professionals and Engg students is increasing each passing year leading to an increase in the Cost of Manufacturing & Services, due to evolving Technologies, Systems, and Practices. A fine chisel is recognized by its cutting Edge, it makes no difference how finely it is made what splendid steel it has, or how well it is forged- if it has no cutting Edge.

### **"Cutting Edge is the Key"**

Diagnosis of problems in Business, It's Measurement, Analysis, and solving, are the Keys to Today's Business requirements. Edutechnest -Programs are designed to develop the Cutting Edge of Professionals in Diagnosis, Measurement, Analysis, and practical Solution Development Models using the right "Japanese Tools and Techniques" after practically implementing them in 500+ organizations globally in 30+ Business Sectors.

## MACHINE LIFE FROM X TO 3X

Extending Machine life from **X to 3X** is possible with **Preventive and Predictive Maintenance**, reducing downtime, optimizing maintenance schedules, and improving equipment reliability.

## LUBRICATION

**Lubrication** is the principle of supporting a sliding load on a friction-reducing film. A lubricant is a substance that reduces friction and wear between moving surfaces by providing a protective film, allowing for smooth movement and separation.



## TYPES OF LUBRICANT

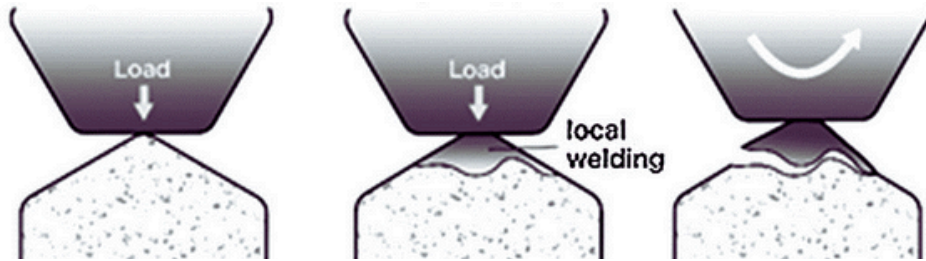
- **Liquid including Emulsion and Suspensions:** Liquid lubricants may be characterized in many ways. One of the most common ways is by the type of base oil used. The following are the most commonly used :

1. Water
2. Mineral Oil
3. Vegetable Oil
4. Synthetic Oil

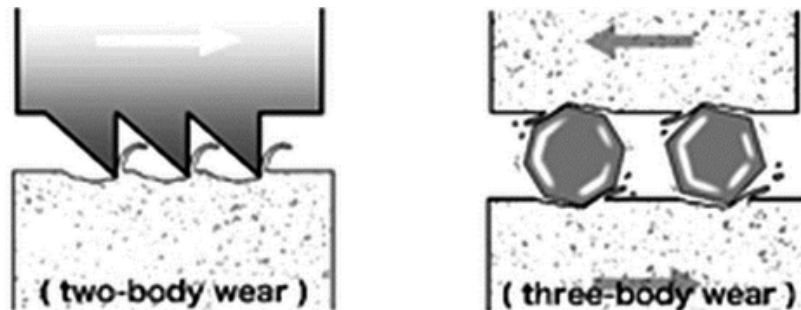


- **Solid Lubricants:** They contain certain types of lubricants, such as silicon, graphite, and PTFE, that have a molecular structure that is extremely slippery and helps to reduce friction between surfaces. They can also be found in spray form, typically mixed with volatile solvents like alcohol or water, and evaporate after application.
  1. Graphite
  2. Molybdenum Disulphide
  3. Teflon
- **Grease Lubricants:** The word grease originally described the rendered fat of animals, the term is now applied more broadly to mean a lubricant of higher initial viscosity than oil, consisting originally of a calcium, sodium, or lithium soap jelly emulsified with mineral oil
- **Paste Lubricants:** Paste lubricants are semi-solid substances used to reduce friction and wear between surfaces in machinery and equipment. They offer enhanced lubrication in high-load or extreme-pressure applications, extending equipment lifespan and reducing maintenance needs.

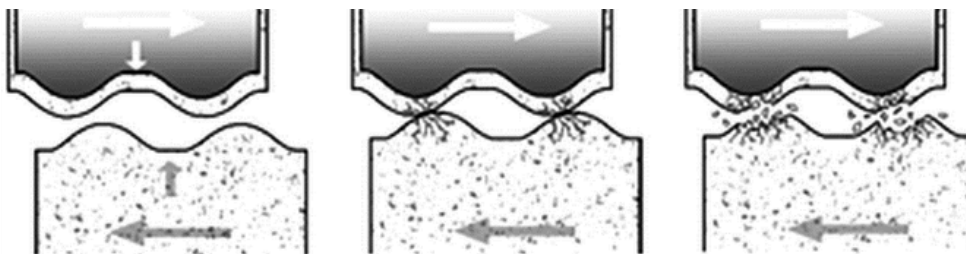
# TYPES OF WEAR AND TEAR



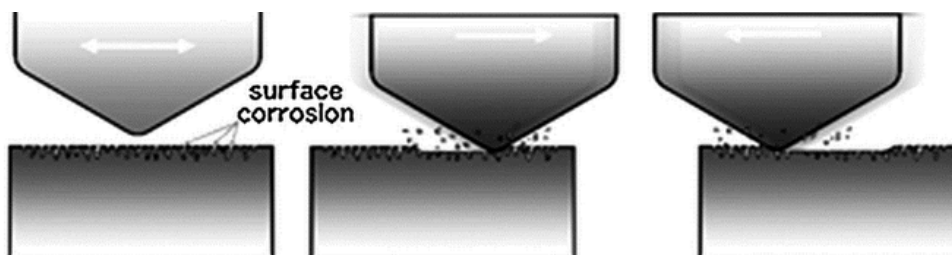
**Adhesive Wear** is also known as scoring or seizing. It occurs when two solid surfaces slide over one another under pressure. Surface projections or asperities are plastically deformed and eventually welded together by the high local pressure.



**Abrasive Wear** material is removed by contact with hard particles it occurs. The particle either may be present at the surface of a second material or may exist as loose particles between two surfaces. Abrasive wear can be measured as a loss of mass by the Taber abrasion test according to ISO 9352



**Fatigue Wear** repeated, alternating mechanical stress leads to the formation and propagation of cracks under the stressed surface, which is thus destroyed.



**Corrosion Wear** is known as rust. This type of damage usually takes place in metallic materials and typically produces oxides and or salts of the original material. Corrosion can be concentrated locally to form a pit or crack or it can extend across or wide area to produce general deterioration.

# IMPROVE OVERALL PLANT OEE

To improve Overall Equipment Effectiveness (OEE) in a plant, it's crucial to address the 16 types of losses identified in Total Productive Maintenance (TPM). These losses include:

1. **Equipment Failure:** Downtime due to breakdowns or malfunctions.
2. **Setup and Adjustment:** Time lost during changeovers and adjustments.
3. **Idling and Minor Stoppages:** Brief pauses or interruptions that accumulate over time.
4. **Speed Loss:** Reduced speed compared to optimal performance.
5. **Defects in Process:** Scrap or rework caused by process errors.
6. **Reduced Yield:** Lower than expected output due to inefficiencies.
7. **Reduced Rate:** Production rate lower than the maximum possible.
8. **Process Rework:** Extra work is required to correct errors or defects.
9. **Waiting:** Idle time due to material, information, or personnel delays.
10. **Operator Care and Process Improvement:** Time spent on non-value-added activities.
11. **Planned Maintenance:** Scheduled downtime for preventive maintenance.
12. **Quality Loss:** Scrap, rework, or customer complaints due to quality issues.
13. **Management Loss:** Inefficiencies stemming from poor planning or decision-making.
14. **Skill Loss:** Reduced efficiency due to inadequate training or skill levels.
15. **Energy Loss:** Wastage of energy resources during production.
16. **Material Loss:** Scrap, rework, or loss of raw materials.

By systematically addressing these losses through initiatives such as predictive maintenance, continuous improvement programs, and employee training, plant managers can significantly enhance OEE and overall operational performance.

# LEARNING OUTCOME OF THE PROGRAMME



**Tribology (Strength of Materials)**



**Role of Leadership & Innovation in Maintenance Function**



**Understanding Wear & Tear and the Purpose of Lubrication**



**Asset Management**



**Maintenance Planning and Scheduling**



**Cost Analysis and Budgeting for Maintenance**



**Strategic Maintenance Management & Data Analytics**



**Capstone Project**



## **One-year Post Graduate Diploma in Preventive and Predictive Maintenance**

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In today's fast-paced business environment, downtime is not an option. That's why proactive maintenance strategies such as Preventive and Predictive Maintenance are essential for ensuring the reliability, efficiency, and longevity of critical assets and equipment. From Maintenance to design of Maintenance, Building Hi-tech Maintenance labs & bringing excellence in every aspect of machine learning.



**Comprehensive  
Curriculum**



**Intellectual Property  
Rights (IPR)**



**Weekend  
Learning Options**



**Hands-On Workshops  
& Simulations**



**Project-Based  
Learning**



**Expert Industry Faculty &  
Consultants from leading  
consulting firms**



**Guest Lectures**



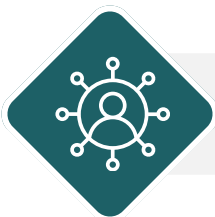
**Interactive Learning  
Environment**



**Industry Best Case  
Studies and Practices**



**Data Analytics**



**Career Growth**



**Job Assistance**



## Condition Monitoring Techniques:

In-depth study of various condition monitoring methods (vibration analysis, thermography, oil analysis, etc.).

Implementing sensors and monitoring equipment.

## Reliability Centered Maintenance (RCM)

Application of RCM principles for optimizing maintenance processes.

Root Cause Analysis (RCA) methodologies.



## Advanced Predictive Maintenance Technologies

Integration of technologies like IoT and AI for predictive maintenance.

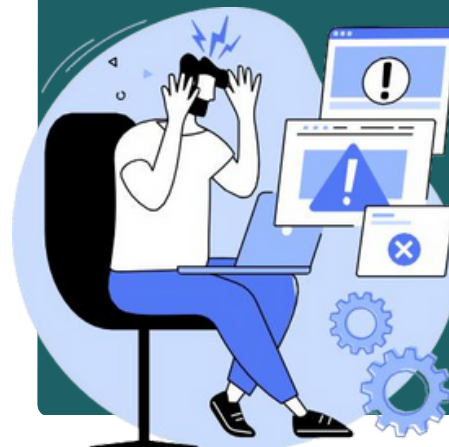
Real-time monitoring and data analysis.



## Maintenance Software Systems

Overview of Computerized Maintenance Management Systems (CMMS).

Implementation and utilization of maintenance software.



1)

- **Tribology (Strength of Materials)**
- **Wear & Tear and its types**
- **Lubrication & its types**

- Wear & Tear, Friction, lubrication of interacting surfaces.
- Focusing on stresses and strains.
- Adhesive Wear, Abrasive Wear, Corrosive Wear, Surface Fatigue.
- Liquid including Emulsion and Suspensions, Solid Lubricants, Grease Lubricants, Paste Lubricants.

## Fundamentals of Maintenance Management

2)

- **Role of Leadership & Innovation in Maintenance Function**
- **Understanding and Purpose of Lubrication**
- **Asset Management**
- **Maintenance Planning and Scheduling**
- **Types of Maintenance**

- Good Maintenance Practices.
- The objective of Maintenance.
- Role of 5S, Safety, and CLITA in Maintenance.
- Materials of components, Design of the system, Lubrication system.
- Understanding the life cycle of assets.
- Asset tracking, valuation, and disposal strategies.
- Intellectual Property Rights (IPR).
- Techniques for effective maintenance planning & scheduling.
- Resource allocation and optimization.
- Preventive, Predictive, Breakdown, Opportunity, Design.

## Implementation and Strategic Management

3)

- **Spare Parts Management**
- **Implementation of Preventive and Predictive Maintenance**
- **Cost Analysis and Budgeting for Maintenance**
- **Strategic Maintenance Management & Data Analytics**
- **Total Productive Maintenance(TPM)**
- **Capstone Project**

- Maintaining an organized inventory of critical parts to minimize equipment downtime and support maintenance activities efficiently.
- Developing and implementing preventive and predictive maintenance programs.
- Case studies and practical applications.
- Budgeting for maintenance activities.
- Cost-benefit analysis of maintenance strategies.
- Aligning maintenance with overall organizational strategy.
- Balancing cost, reliability, and efficiency.
- Autonomous maintenance, planned maintenance, and continuous improvement activities.
- Integration of learning through a real-world preventive and predictive maintenance project.
- Presentation of findings and recommendations.

## Pedagogy

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Our teaching methodology emphasizes high interactivity, technological integration, and the use of a wide array of pedagogical tools. This includes engaging discussions centered around key concepts, brought to life through real-world industry cases, interactive simulations, and hands-on activities.

## Programme Delivery

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The program sessions will utilize a cutting-edge Interactive Learning (IL) platform, using LMS (learning management system) providing Direct-to-Device (D2D) access via Desktop, Laptop, or Tablet for learners' convenience. Additionally, Chamber consulting services will be gradually introduced, allowing participants to address real-world challenges while implementing preventive and predictive maintenance.

**Admission Open  
From 1st May, 2024**

## Capstone Project

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The 2-3 day industry-campus module at EdutechNest provides a condensed, hands-on learning experience that connects academic theory with practical industry insights. Through immersive sessions both on-campus and in industry environments, participants gain exposure to real-world challenges and emerging trends relevant to their field. The curriculum focuses on key concepts and practical skills, bridging the gap between academic knowledge and industry practices.

## Eligibility Criteria

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- Bachelor's degree or equivalent from a recognized university in any discipline.
  - Participants who are not currently working, are also eligible to apply for the program.
- \* Internship and training experience is not included in full-time work experience.

## Who Should Attend?

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Practitioners in manufacturing, project management, services, or logistics sectors and people aspiring to be a part of these sectors.

## Admission Criteria

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Participants would be selected from corporate nominations and self-sponsored individual applicants based on their overall profiles and credentials.

## Attendance Criteria

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A minimum of 75% attendance is a prerequisite for the successful completion of the program.



**Mr. Ravinder Kumar**  
**Director, EdutechNest**

With over 25 years of expertise in Business Consulting, Technical Education, and Manufacturing, he served as Director & Head of Manufacturing Excellence at CII Centre for Competitiveness, Chandigarh. Adept in Operational Excellence, he's published articles in leading national newspapers. Holds B.Tech in Mechanical Engineering, PG from IIM Trichy in Strategy Management, and certifications from JIPM, Japan, and Federal Ministry of Commerce & Technology, Germany. Collaborated with UNIDO, UNDP, WWF, and Bill Gates Foundation. Consulted 500+ companies, trained 30,000+ professionals, and worked with benchmark companies like Toyota, BMW, and Mercedes. Assessed CII and ACMA Annual Awards at the National Level.

Conducted  
2000+  
Programs

Trained  
30000+  
Professionals

Reported  
savings  
for more than  
600 Crores

Served 500+  
Organizations

## Experts Faculty Members (Consulting Domain)



Dr. Dharmvir is a seasoned professional with 29 years of expertise in Lean Kaizen implementation across diverse industries in India and abroad, primarily in the auto sector for 18 years.

**(For a detailed profile please scan the QR code.)**

**Dr. Dharmvir Uppal**  
**Business Coach, Data Analyst**



Mr. Amit Sanghvi, Principal Counselor at ICME, brings over 31 years of industry experience. Before ICME, he served as Head of Operations at M/S Poly Plast Chemi Plants India Pvt Ltd, Vadodara, and worked for 16+ years at the Confederation of Indian Industry (CII), focusing on enhancing competitiveness in Indian industries.

**(For a detailed profile please scan the QR code.)**

**Mr. Amit Sanghvi**  
**Principle Counselor**

## Experts Faculty Members (Professors)



**Dr. P.S. Ranjit**

**Professor, Aditya University**



Dr. P.S. Ranjit, Board of Studies Member of Jawaharlal Nehru Technological University, Kakinada (JNTUK). SAEINDIA Faculty Development Core Committee Member, SAEINDIA Amaravathi Division MC Member, and had more than 22 years of teaching experience in both U.G. and P.G. programmes and 15 years of research experience along with 10 years administrative experience as head -Automotive Design Engineering at UPES, Dehradun. Dr. P.S. Ranjit is presently associated with Aditya University since 2018 and member of many professional bodies.

**(For a detailed profile please scan the QR code.)**



**Prof. Annemneedi Lakshmanarao**

**Professor, Aditya University**



Prof. A.Lakshmanarao, who is currently pursuing his Ph.D. at Andhra University, Vishakhapatnam (thesis already submitted), has 15 years of teaching experience. He completed his M.Tech in Software Engineering from Godavari Institute of Engineering & Technology (GIET) and a B.Tech in Computer Science and Information Technology from B.V.C. Engineering College.

**(For a detailed profile please scan the QR code.)**

## Experts Industry Members (Guest Faculty)

Various guest faculty from diverse fields such as engineering, automotive, leather, white goods, construction, etc., will join to share their best case studies with the students. This collaborative approach enriches the learning experience by providing real-world examples and insights from different industries, enhancing the student's understanding and perspective on various subjects.





Indian Centre for Research and Manufacturing Excellence



EdutechNest  
SHARPEN THE SAW

# Clients Served:

## Large Companies



TATA MOTORS

# RANBAXY

## Medium Companies



# Medium Companies



# Medium Companies

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# Small Companies

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# Global Bodies

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## Certification

- Students who complete the programme and fulfill all the prescribed requirements will be awarded a 'Certificate of Completion'.

## Assessment & Evaluation

- The evaluation methodology is at the discretion of EdutechNest faculty. The methodology includes online exams, written tests, assignments, and any other component as decided by EdutechNest faculty.
- The programme may require participants to work on individual/group assignments and/or projects. The main objective of such assignments/projects will be to help the participants apply their conceptual learning in the programme to actual organizational decision scenarios.



## Munjal Group

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Committed to delivering excellence through its top-quality products, the Munjal Group is a multifaceted global enterprise with diversified interests such as EVs, exports, bicycles, healthcare, and real estate. The Group has a global footprint with a presence in more than 80 countries for its bicycles, and 36 countries for its future-oriented electric bikes, making it one of the top bicycles and electric bike manufacturers in the world. The Group takes pride in creating products that are designed by keeping sustainability in mind.

Through its various endeavors, the Group has emphasized its commitment to a sustainable and green planet. To this end, the Group initiated the development of the Electric 2-wheeler (E2W) business in India in the year 2000 and subsequently launched its first battery-fitted Cycles and first electric scooter in the years 2003 & 2007 respectively. All its ventures follow the legacy of creating products that are future-oriented and have been designed keeping sustainable means in mind.



Indian Centre for Research  
and Manufacturing Excellence



## About Indian Centre for Research and Manufacturing Excellence (ICME)

Indian Centre for Research and Manufacturing Excellence (ICME) is one of the top 10 Manufacturing Consultants in India. We have drawn inspiration from Japan's SME industry model, which involves regional ministries solely dedicated to industry-focused universities. Our enthusiasm for the Japanese approach extends to integrating their practices. Indian Centre for Research and Manufacturing Excellence (ICME) was established in 2014 and is working together with more than 500+ Manufacturing, Education, and Service Industries PAN India in different sectors to make them competitive so that they can grow from small to medium and medium to large with an increase in profitability via -

- Specialized Training
- Profitability Improvements
- Plant Layout Design with Process Engineering
- Cluster Programs (Operational Excellence)
- Conferences and Summit

# ICME

## EMPOWERING BUSINESS GROWTH FROM SMALL TO LARGE



Ravinder Kumar  
Managing Director

India's economic resilience in Q1 FY23, surpassing the UK, highlighted its global prominence in the post-COVID-19 era. Today, it is the 5th largest with a GDP of \$3.7 trillion (as of FY24). This positive trajectory is driven by increased employment, a surge in private consumption, and favorable consumer sentiment. However, within the industry, the crucial need for manufacturing consulting has become apparent. Companies are recognizing the vital role of specialists who provide tailored strategies and insights. In this ever-evolving landscape, expert guidance has become invaluable, empowering companies to navigate complexities, make informed decisions, and stay ahead of industry trends.

The Indian Center for Research and Manufacturing Excellence (ICME) plays a key role in guiding companies through the growth stages, facilitating their transition from small to medium and eventually to large scales. Its focus extends across a broad spectrum of services to address varied needs. With a rich history of collaboration with over 500 companies in the past 16-17 years, the organization's evolution is remarkable. It commenced its journey by serving through CII (Confederation of Indian Industry) and subsequently established its independent entity in 2014. This progression underscores

the center's steadfast commitment to providing comprehensive support, significantly contributing to the growth and development of businesses in India.

### Specializing in Operational Excellence

Guiding clients in the implementation of strategic processes, ICME is a global consulting firm specializing in operational excellence. Its primary objective is continual revenue acceleration, impacting both the top and bottom lines. Through a Japanese-inspired, holistic, systematic, and scientific approach, ICME integrates training, consulting, coaching, and diagnostics seamlessly. This unique methodology is crafted to support the growth journey, ensuring a smooth transition from a small to medium enterprise and then to a large one for sustained and robust expansion. ICME's emphasis on addressing invisible losses aims to enhance productivity, quality, costing, R&D, and layouts. This comprehensive approach results in a 5 percent or more improvement, making companies more profitable and globally competitive.

"In my view, the critical aspect is whether companies are taking the right steps for their growth, be it in pharma, auto, or the white goods industry. It is not only about excellence but also consistency and adaptability. Companies need a 360-degree perspective, evaluating each vertical, from R&D to manufacturing, marketing, and new business development. Each department functions like a cricket team, where every player must give their best for collective victory," says Ravinder Kumar, Managing Director of ICME.

### Integrating Japanese Approach

Responding to the increasing demand for an industry-oriented curriculum, ICME has collaborated with multiple

universities. This partnership aims to produce graduates who are well-prepared for the workforce, leading to improvements in campus recruitments. "We have drawn inspiration from Japan's SME industry model, which involves regional ministries solely dedicated to industry-focused universities. Our enthusiasm for the Japanese approach extends to integrating their practices. These principles have been effective in enhancing business excellence across various domains," adds Ravinder.



***We have drawn inspiration from Japan's SME industry model, which involves regional ministries solely dedicated to industry-focused universities. Our enthusiasm for the Japanese approach extends to integrating their practices***

In today's VUCA world, the ability to adapt swiftly is not just a requirement but a guiding principle across various sectors, including consulting. Embracing this imperative, ICME is introducing innovative industry-focused courses that mark a significant shift in the education landscape. Strengthening its ties with esteemed institutions like IITs, it actively engages in diverse courses and seminars. Transitioning from theoretical foundations to practical applications, its commitment lies in offering courses that directly tackle real-world challenges, covering areas like preventive maintenance, machine redesigning, and the integration of cutting-edge technologies such as Industry 4.0, AI, and big data science to elevate machine efficiency. ||

Industry **Outlook**



IS PROUD TO PRESENT

**ICME**

AS ONE OF THE

TOP 10

**MANUFACTURING  
CONSULTANTS**

2024

*in acknowledgement of its unwavering focus and dedication  
to achieve excellence in quality and delivery in this field.*

*Sudhakar Singh*

Sudhakar Singh  
Managing Editor  
Industry Outlook





**ADITYA**  
UNIVERSITY

## About Aditya University

Aditya University is a State Private University established under the Andhra Pradesh Private Universities Act of 2016. It emerged from the well-known Aditya Engineering College in Surampalem, Kakinada District, Andhra Pradesh. Aditya University is committed to providing high-quality higher education that meets global standards. The programmes are well-designed to balance academic rigour and practical relevance, preparing students to effectively address both societal and industrial challenges. Experienced and knowledgeable Faculty foster intellectual curiosity, critical thinking, and cooperation among the diverse student population in an inclusive environment, allowing them to reach their full potential and contribute to society. The institute offers 11 undergraduate programmes, 06 graduate programmes in engineering, a Master of Business Administration, and a Master of Computer Applications. Aditya Group consists of 60+ Institutions, 6000+ Staff and 60,000+ students.

**(For more details about Aditya University please scan below QR code)**



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**Facebook**      <https://www.facebook.com/profile.php?id=61557440255505>

**Instagram**      <https://www.instagram.com/profile.php?id=61557440255505>

