2026

MMK



DEPARTMENT OF

METALLURGICAL AND MATERIALS ENGINEERING

NATIONAL INSTITUTE OF TECHNOLOGY WARANGAL

Celebrating 60 Years of Excellence (Estd. 1965)

CONTENTS



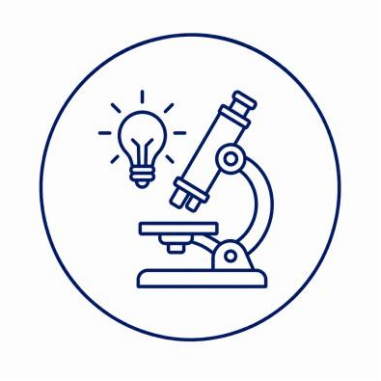
1. Overview of the Department



2. Students



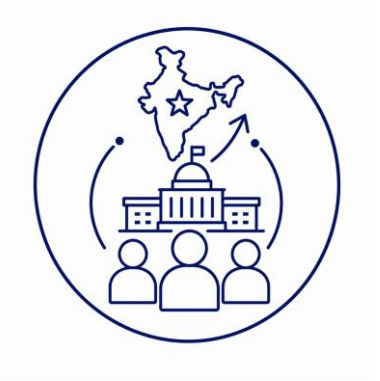
3. Faculties



4. Research Activities



5. Outreach Activities



6. Contributions for Nation Building

Vision and Mission of the Department



Vision

Attain global recognition in research and training to meet challenging needs of Metallurgical and Materials Engineering with ethical and moral responsibility towards society.



Mission

- Provide outstanding technical education for analysis, design and operation of metallurgical and materials systems.
- Keep abreast with rapid strides of technology and improve academic standards through innovative teaching and learning processes.
- Engage in quality research in metallurgical, materials and allied engineering areas.
- Develop academic linkages with leading industries for mutual benefit.
- Develop linkages with leading academic, research and industrial organizations for societal benefit.

1. Overview of the Department

1965 - Establishment of Metallurgical Engineering Department

- **M. Tech (IM) and**
- **Ph. D. Programs**

Department renamed as **Metallurgical and Materials Engineering Department**

NBA accreditation for UG & IM

1983 | 2004 | 2008

2016 | 2011 | 2010

50 Years Golden Jubilee

Starting of **M. Tech. Materials Technology**

DST-FIST Sponsored Department

2018 | 2019 | 2022

State-of-the-art labs

- High Temp. Materials lab
- Fatigue & Fracture Mechanics Lab

NBA accreditation for UG

AUSC projects Granted (23 Cr)
Moved to **New building**

2025 | 2023 | 2023

State-of-the-art **welding and joining labs** established

Starting of **M. Tech. WTNDT**

Courses Offered – B.Tech.

B. Tech. in Metallurgical and Materials Engineering

4-Year (8-Semester) Undergraduate Program

YEAR 1
SEMESTERS 1–2

Foundation Stage

Common coursework for all engineering branches

- Basic Sciences
- Engineering Fundamentals
- Strong Foundation for Core Learning

YEAR 2
SEMESTERS 3–4

Core Introduction

Introduction to core courses in Metallurgical and Materials Engineering

- Metallurgical Principles
- Materials Engineering Fundamentals
- Discipline-specific Core Courses

YEAR 3
SEMESTERS 5–6

Advanced Learning & Electives

Elective courses begin from the fifth semester onwards

- Advanced Core Courses
- Departmental Electives
- Opportunity to Specialize in Areas of Interest

YEAR 4
SEMESTERS 7–8

Integration & Application

Students consolidate learning and complete a major project in the final semester

- Advanced Study
- Practical Exposure
- Major Project in Final Semester
- Application of Theoretical and Practical Knowledge

PROGRAM HIGHLIGHTS

- 4 Years
- 8 Semesters
- Progressive Learning Structure
- Core + Elective Curriculum
- Final Semester Major Project

Courses Offered - B.Tech. + M.Tech. Dual Degree

Dual Degree (Bachelor + Master of Technology)

Metallurgical and Materials Engineering | 5-Year (10-Semester) Integrated Program

YEAR 1
Semesters 1–2



Common Foundation

Common courses with B.Tech. students

- Basic Sciences
- Engineering Fundamentals
- Introductory Engineering Courses

YEAR 2
Semesters 3–4



Core Department Learning

Strong foundation in Metallurgical and Materials Engineering

- Core Metallurgical Concepts
- Materials Science Fundamentals
- Discipline-specific Courses

YEAR 3
Semesters 5–6



Advanced Undergraduate Preparation

Continued learning alongside regular B.Tech. students

- Advanced Core Courses
- Laboratory Exposure
- Applied Learning in MME

YEAR 4
Semesters 7–8



Specialized Integrated Study

Advanced coursework with M.Tech. students in WTNDT

- Welding Technology
- Non-Destructive Testing
- Advanced Technical Courses

YEAR 5
Semesters 9–10



Research & Professional Depth

In-depth technical knowledge and research exposure

- Advanced WTNDT Courses
- Research Exposure
- Comprehensive Technical Understanding

PROGRAM HIGHLIGHTS

- 5 Years
- 10 Semesters
- Integrated Bachelor + Master Pathway
- First 3 Years with B.Tech. Curriculum
- Final 2 Years with M.Tech. WTNDT Coursework

The program provides a comprehensive grounding in Metallurgical and Materials Engineering, while building advanced technical expertise and research exposure in **Welding Technology and Non-Destructive Testing.**

Courses Offered – M.Tech.

M.Tech. in Materials Science and Technology

Centre for Materials Science and Technology

Host Department: Department of Metallurgical and Materials Engineering

PROGRAM STRUCTURE ROADMAP

SEMESTER 1	SEMESTER 2	SEMESTER 3	SEMESTER 4
Advanced Coursework	Coursework + Minor Project	Major Project Work	Major Project Work
Core and interdisciplinary coursework	Advanced courses, electives, and minor project	Research-intensive project work	Thesis/dissertation, analysis, and project completion

First two semesters focus mainly on coursework and minor project; third and fourth semesters are devoted to major project work.

CURRICULUM HIGHLIGHTS

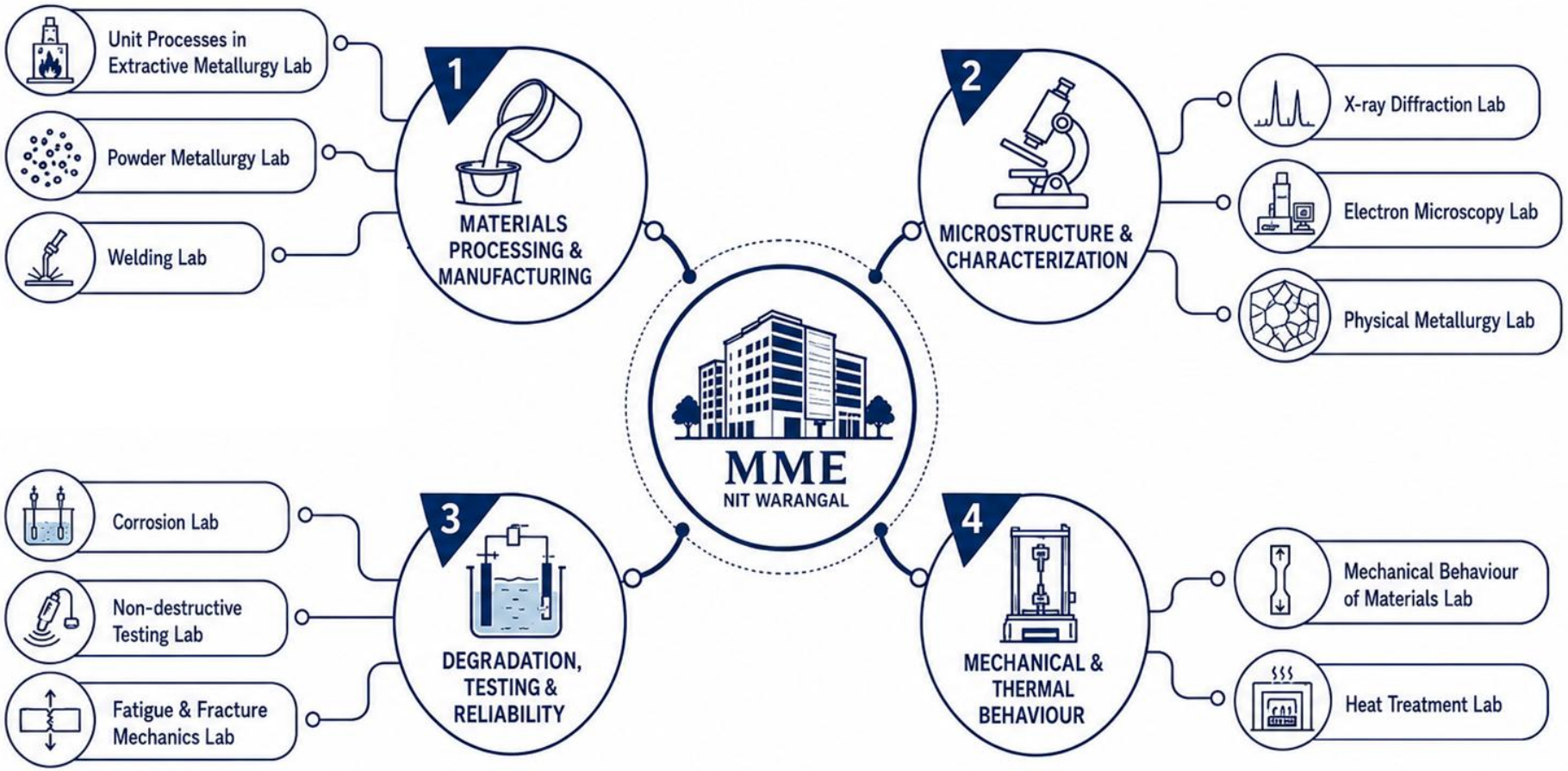
- Advanced Physical Metallurgy
- Semiconductor Materials and Devices
- Artificial Intelligence and Machine Learning in Materials Engineering
- Advanced Materials Characterization Techniques
- Light Weight Metals and Alloys
- Materials for Advanced Nuclear Power Plants
- Nanotechnology
- Nanochemistry and Smart Materials
- Bulk Nanostructured Materials
- Introduction to Biomaterials
- Microwave Materials Processing: Principles and Applications
- Energy Materials: Conversion and Storage
- High Temperature Materials
- Materials for Extreme Environments

PROGRAM HIGHLIGHTS

2 Years | 4 Semesters | 66 Credits | Intake: 15 | Coursework + Project | Advanced & Interdisciplinary

PhD (Full-time and Part-time in various domains of Metallurgical Engineering and Materials Science

Departmental Academic and Research Laboratories



From extraction and processing to characterization and performance evaluation – our laboratories provide comprehensive experimental exposure across the entire materials engineering spectrum.

Major Facilities – Academic Labs

Unit Processes in Extractive Metallurgy Lab



Compression Moulding Machine



Rotary Ball Mill



Vacuum Hot Press



Hot Air Oven

Corrosion Laboratory





Electrochemical Workstation

Slow Strain Rate Testing Unit

Powder Metallurgy Lab



Stir Casting Unit



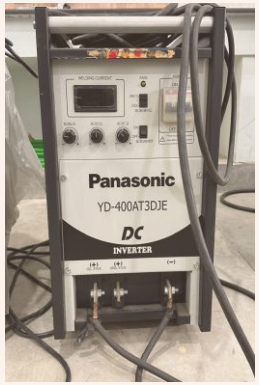
Microwave Sintering Furnace

Major Facilities – Academic Labs

Welding Laboratory



Sub Merged Arc Welding



Manual Arc Welding



Gas Metal Arc Welding



Spot Welding Machine

X-ray Diffraction Lab



PanAnalytical XRD

Electron Microscopy Lab

Tescan Vega 3 LMU Scanning Electron Microscope

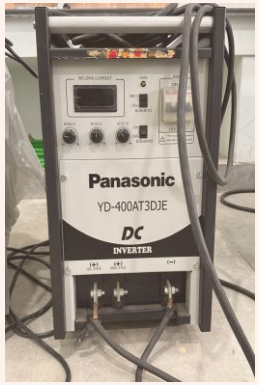


Major Facilities – Academic Labs

Welding Laboratory



Sub Merged Arc Welding



Manual Arc Welding



Gas Metal Arc Welding



Spot Welding Machine

X-ray Diffraction Lab



PanAnalytical XRD

Electron Microscopy Lab

Tescan Vega 3 LMU Scanning Electron Microscope



Major Facilities – Academic Labs

Mechanical Behaviour of Materials Lab


30KN UTM


Fatigue Testing Machine


Vickers Hardness Tester

Heat Treatment Lab


Vacuum Induction Melting Unit


Jominey End Quench cum Hot Mounting Press

Physical Metallurgy Lab


Stereo Optical Microscope



Double Disc Polishing Machines

Major Facilities – Research Labs

High Temperature Materials Laboratory



Machines 1 to 10



Machines 11 to 18

Fatigue & Fracture Mechanics Laboratory



Servo-Electric Creep – Fatigue Crack Growth Testing (CFCG) Machines

STUDENT ACHIEVEMENTS

1. T. R. Anantharaman Education and Research Foundation (TRA-ERF)

- Academic excellence
- Merit recognition
- Fellowship support
- Research encouragement

2. GATE Achievements



- Competitive exam excellence
- All India merit recognition
- Pathway to higher opportunities

3. OP Jindal Engineering & Management Scholarship (OPJEMS)

- Merit-based scholarship
- Financial support for education
- Encouraging academic leadership

4. IIM-PRIME Internship



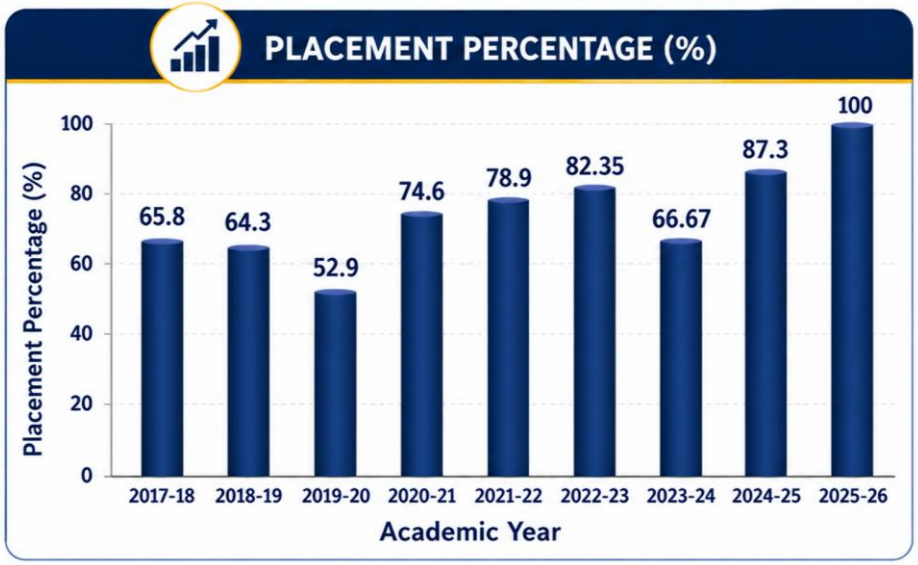
- Prestigious internship opportunity
- Industry exposure
- Leadership & professional growth
- Real-world learning

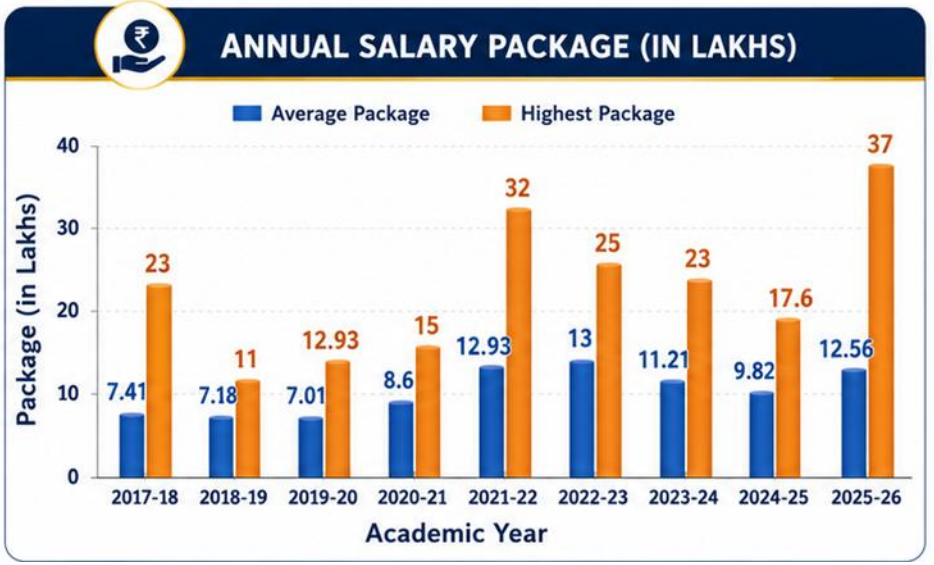
5. Rupa Rahul Bajaj Scholarship



- Women in engineering empowerment
- Merit & potential recognition
- Financial aid for higher education
- Building future leaders

Student Placement





KEY HIGHLIGHTS

HIGHEST PLACEMENT PERCENTAGE
87.3%
(2024-25)

HIGHEST PACKAGE
37 LAKHS
(2025-26)

STRONG PLACEMENT PERFORMANCE IN RECENT YEARS

Major Recruiters

TATA MOTORS
Collins Aerospace
Reliance Industries Limited
CAIRN
vedanta transforming for good
ExxonMobil
EDVIZO Shaping the future
Fractal Analytics
TATA CONSULTANCY SERVICES
accenture
quantiphi Solving What Matters
EXL

3. Faculty



Dr. Ajoy Kumar Pandey
Asso. Professor & Head of the Department
Ph.D. (IIT Kharagpur)
YOJ: 2013

Specialisation:
Mechanical Metallurgy
Bio-Ceramics
Powder Metallurgy



Dr. Asit Kumar Khanra
Professor
Ph.D (IIT Kharagpur)
YOJ: 2008

Specialisation:
Powder Metallurgy, Materials Processing and Microstructure Evolution, Ceramics, Corrosion Electrical Discharge Machining (EDM)



Dr. Bangmaya Satpathy
Assistant Professor
Ph.D. (IIT Kharagpur)
YOJ: 2025

Specialisation:
Surface coatings, Functionally Graded Materials, Electrochemical Characterization Techniques, Corrosion



Dr. Bharath Bandi
Assistant Professor
Ph.D. (University of Warwick)
YOJ: 2024

Specialisation:
Fusion Alloys, Automotive Steels
Dissimilar metal welding
Phase Transformation, Alloy Design



Dr. B. Srinivasa Rao
Asso. Professor
Ph.D (NIMS Japan)
YOJ: 2014

Specialisation:
Process-Microstructure- Property Relationship Ultrafine/Nanocrystalline Materials, Phase Transformations Metastable Microstructures



Dr. Brahma Raju Golla
Professor
Ph.D (IIT Kanpur)
YOJ: 2013

Specialisation:
Ultra High Temperature Ceramics
Advanced Materials Processing
Physical Metallurgy, Tribology of Materials, Thin film Coatings



Dr. G. V. S. Nageswara Rao
Professor (HAG)
Ph.D. (NIT Warangal)
YOJ: 1996

Specialisation:
Creep, Fatigue, CFI, Materials Testing and Characterization; Thermo-Mechanical Processing, Nanomaterials; Powder Metallurgy and Surface Engineering



Dr. N. Kishore Babu
Professor
Ph.D (IIT Madras)
YOJ: 2018

Specialisation:
Welding Metallurgy
Nanocomposite Materials
Additive Manufacturing



Dr. T. Mahesh Kumar
Professor
Ph.D (IIT Madras)
YOJ: 2018

Specialisation:
Metal Joining, Hard facing
Additive Manufacturing
Light metals, Functional Materials
Metal Matrix Nanocomposites

3. Faculty



Dr. Mir Ishfaq
Assistant Professor
Ph.D. (IIT Bombay)
YOJ: 2025

Specialisation:
Process Metallurgy, Steel Making,
Thermodynamics of Materials
Extractive metallurgy



Dr. N. Narasaiah
Professor (HAG)
Ph.D (IIT Kharagpur)
YOJ: 2012

Specialisation:
Mechanical Behaviour of Materials
Fatigue, Fracture Mechanics
Failure Analysis



Dr. Nicky Kisku
Assistant Professor
Ph.D (IIT Kharagpur)
YOJ: 2025

Specialisation:
Development of Lightweight Structural
Materials, structure-properties correlation,
Thermo-Mechanical Processing and Heat
Treatment of Steels



Dr. R. Arockia Kumar
Professor
Ph.D. (KAIST South Korea)
YOJ: 2014

Specialisation:
Shape Memory Alloys
Biodegradable materials
Friction Stir Welding



Dr. S. Roohan Farooq Lala
Assistant Professor
Ph.D (IISc Bangalore)
YOJ: 2024

Specialisation:
Corrosion-resistant coatings
Microstructure - Property correlation
PEM water electrolyzer for green
hydrogen production



Dr. Sanghamitra Moharana
Assistant Professor
h.D (University of Warwick)
YOJ: 2024

Specialisation:
Energy materials, Batteries
Lithium-ion Batteries Characterization
Techniques



Dr. Sweta Kumari
Assistant Professor
Ph.D (IIT Kharagpur)
YOJ: 2025

Specialisation:
Computational Materials Science
DFT, MD Simulations of Dislocation
Nucleation, Statistical Modelling



Dr. Shanker Kumar
Assistant Professor
Ph.D (IIT BHU)
YOJ: 2025

Specialisation:
Alloy Development
Computational Material Science



Dr. Sukla Mondol
Assistant Professor
Ph.D (IISc Bangalore)
YOJ: 2019

Specialisation:
Alloy Development
Microstructural Characterization (TEM)
Material Processing
Metal Matrix Nanocomposites

3. Faculty



Dr. S. Uma Maheswara Rao
Associate Professor
Ph.D (USF, USA)
YOJ: 2018

Specialisation:
Non-equilibrium Processing of Materials
Nd-Fe-B Magnets
Materials Characterization



Dr. C. Vanitha
Professor
Ph.D. (IIT Bombay)
YOJ: 2008

Specialisation:
Friction Stir Welding
Texture, Corrosion
Additive Manufacturing



Dr. Varam Sreedevi
Assistant Professor
Ph.D. (University of Hyderabad)
YOJ: 2018

Specialisation:
Bulk Nanocrystalline Materials
Nanomaterials, Nanoindentation
Materials for On-demand Hydrogen Generation

Adjunct Professors



Dr. Madhusudan Reddy
Adjunct Professor
Ph.D. (IIT Madras)
YOJ: 2023

Specialisation:
Welding Engineering, Surface Engineering
Friction Stir Welding
Additive manufacturing



Dr. Vikas Kumar Saxena
Adjunct Professor
Ph.D (IIT Madras)
YOJ: 2025

Specialisation:
Structural integrity
Fatigue of materials
Failure analysis

1 High Temperature Materials



2 Fatigue & Fracture



3 Welding & Additive Manufacturing



Academic Research Groups

4 Energy Materials



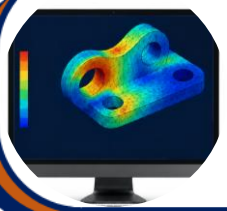
5 Ceramics & Composite Materials



6 Powder Metallurgy



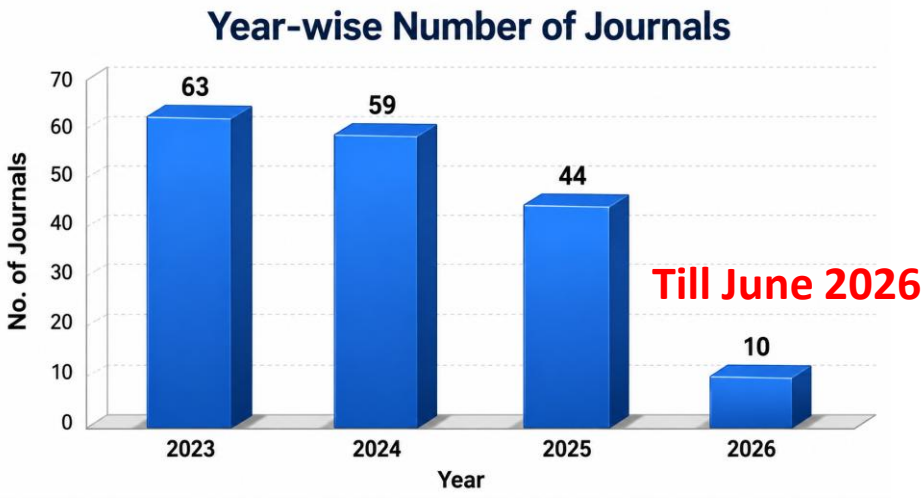
7 Computational Materials



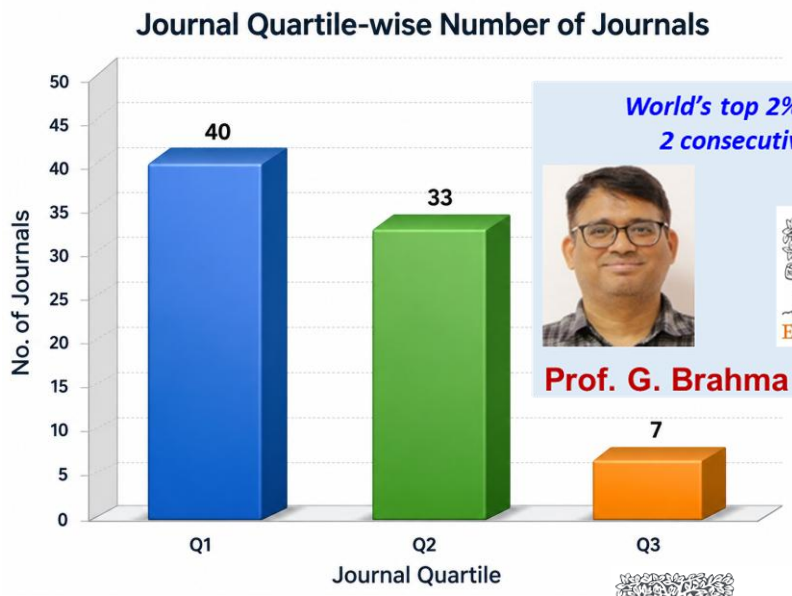
8 Process Metallurgy



Research Portfolio



Till June 2026



World's top 2% scientists: 2 consecutive years

Prof. G. Brahma Raju

ELSEVIER

WORLD'S TOP 2% SCIENTISTS' LIST STANFORD UNIVERSITY

RESEARCH INDICATORS

Total Publications	818
Total Citations	16000+
Avg. Citations / Faculty	669
Peak Citations	2,935
Avg. h-index	39
Avg. i10-index	15.6
Peak h-index	25

Ph.D. STUDENTS

Staff details	Numbers
Ongoing Full-time Students	24
Ongoing Part-time Students	22
Total PhD Awarded	53

Major Publishers

ELSEVIER

SPRINGER NATURE

MDPI

WILEY

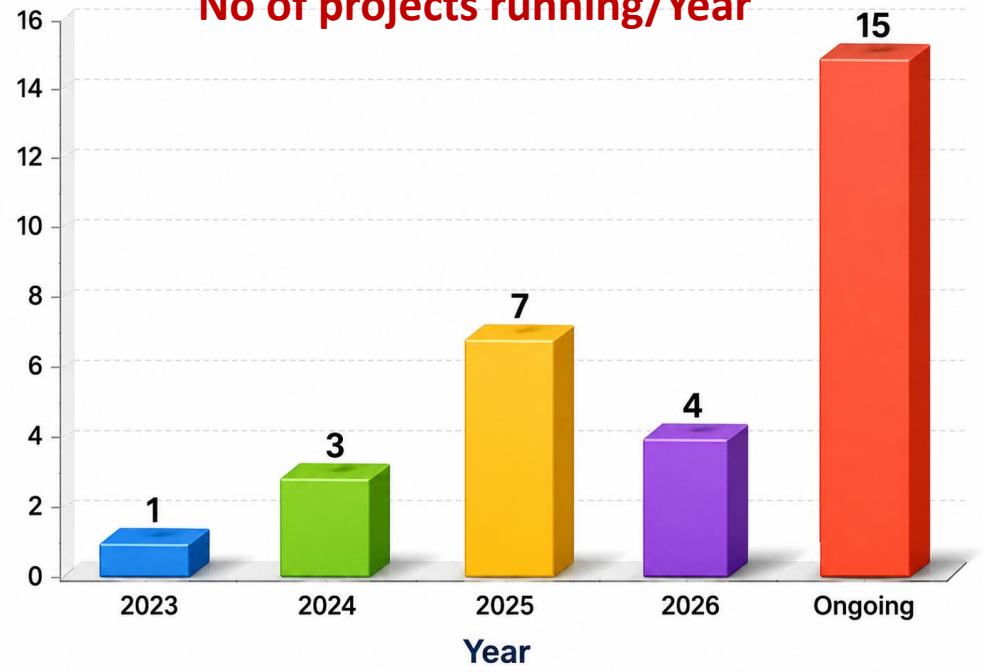
Sage

IOP Publishing

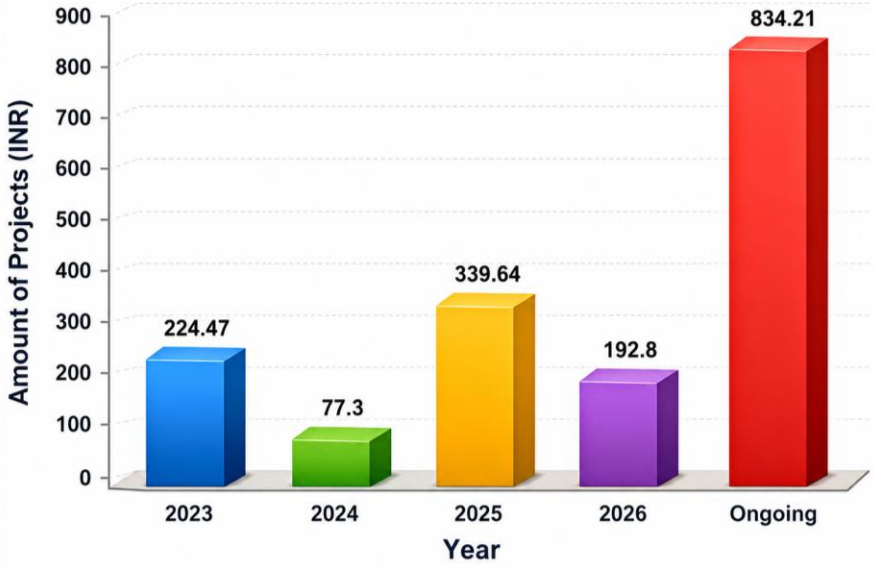
Taylor & Francis
Taylor & Francis Group

Sponsored Research Projects

No of projects running/Year



Worth of projects/Year (₹ Lakhs)



Ongoing Consultancy

DEFENCE R & D ORGANISATION
GAS TURBINE RESEARCH ESTABLISHMENT

206.2 Lakhs

Rockwell
Next-Gen Cooling Solutions
Since 1986

3.06 Lakhs

Major Funding Agencies

NRF

ARCI

DRDO
GTRE

BRNS
Board of Research in Nuclear Sciences

SMST
Shape Memory & Superelastic Technology
ASM INTERNATIONAL

Symposia/Conferences organized







Three Editions of the **International Conference on Advances in Minerals, Metals, Materials, Manufacturing and Modelling (ICAM5-2025)** in **2019, 2023 & 2025**





- **Feb 2025** **Semiconductor Materials & Devices Workshop**
- **Jan 2025**

Structural Materials Excellence

Steel, Concrete & QA Systems



- **Feb 2025**

Phase Field Modelling

(MMES & IIMSC)

Speakers: IIT Madras • IIT Bombay • IISc Bangalore

Jan 2025



International Collaborations

Empa
Materials Science and Technology

SMST
Shape Memory & Superelastic Technology
ASM INTERNATIONAL

UTM
UNIVERSITI TEKNOLOGI MALAYSIA

CNR ISSMC
Istituto di Scienza, Tecnologia e Sostenibilità per lo Sviluppo dei Materiali Ceramici

UNIVERSITY OF WARWICK

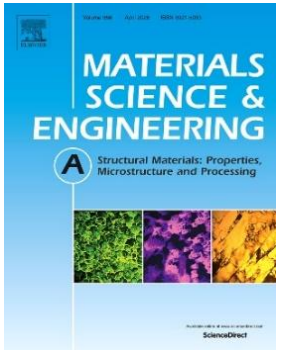
UNIVERZA V LJUBLJANI

UNIVERSITI TEKNOLOGI MARA

KIMS
Korea Institute of Materials Science

University of Maribor

UNB
EST. 1785
UNIVERSITY OF NEW BRUNSWICK











Journals Peer Reviewed

nature

SCIENTIFIC REPORTS

6. Contributions to the Nation

1 High-Temperature Materials Testing

- Creep & stress rupture
- Low-cycle fatigue (LCF)
- Creep-fatigue interaction
- Failure analysis & metallography
- AI/ML-based life prediction

2 Fatigue, Fracture & Advanced Ceramics

- Crack growth testing
- Fractography (fracture surface analysis)
- Life estimation (crack growth models)
- Alumina/zirconia component development
- Functional ceramic products (e.g., zirconia)

Strategic Sectors Impacted

- Aerospace & Defence
- Power Plants and Energy Systems
- Automotive and Mobility
- Nuclear and Petrochemical Sectors
- Advanced Manufacturing and Process Industries
- Electronics / Functional Ceramic Applications

Atmanirbhar Bharat / Reduced Import Dependence

Waste-to-H_2 through Al Hydrolysis

Al waste/ recycled Al

Engineered Al-based composites

Hydrolysis with water

On-demand H_2 generation

Clean energy applications





Degradable Zn Alloy Bioimplants

Zn-Mg/Zn-Mn Alloy



Processing (FSP/HE)

Improved properties

Bioimplant manufacturing

Clinical studies



National Importance

- Supports Green Energy Mission
- Circular Economy
- Energy Security
- Clean Mobility
- Potential commercialization

- Economical
- Reduced repeat surgery
- Reduced import
- MedTech Manufacturing
- Clinical Translation

Contributions of Nd-Fe-B Magnet Research to National Importance

Nd-Fe-B Magnet Research

- Synthesis & Processing
- Core-Shell Engineering
- Property Optimization
- Recycling

(a) Electric Vehicles



(c) Wind Energy



(b) Medical Technology



(d) Recycling



National Benefits



Clean Energy Transition
Enables EVs, wind power and efficient technologies

Atmanirbhar Bharat / Reduced Import Dependence
Build self-reliance in critical rare-earth magnet supply

Strategic Materials Security
Secure supply of critical rare-earth elements

Advanced Manufacturing Capability
Strengthens high-tech manufacturing ecosystem

Sustainable Use of Critical Rare-Earth Resources
Responsible use, recycling and long-term resource sustainability

Passing-out Batch of 2022-2026
Department of Metallurgical and Materials Engineering



Thank You