

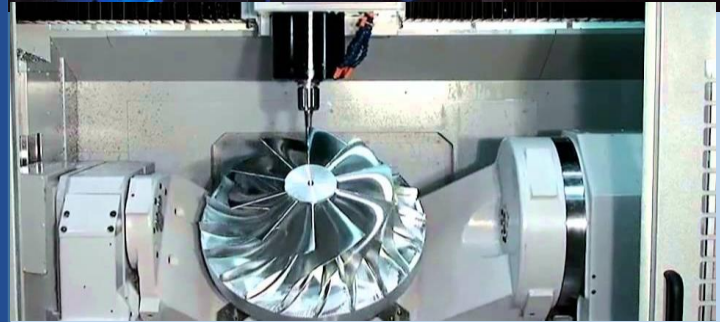
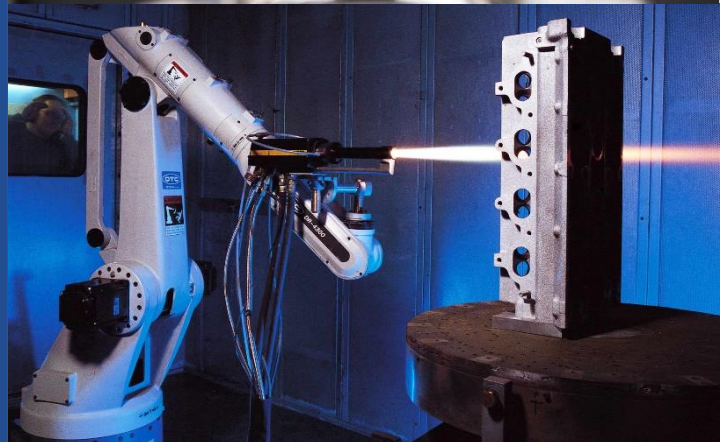
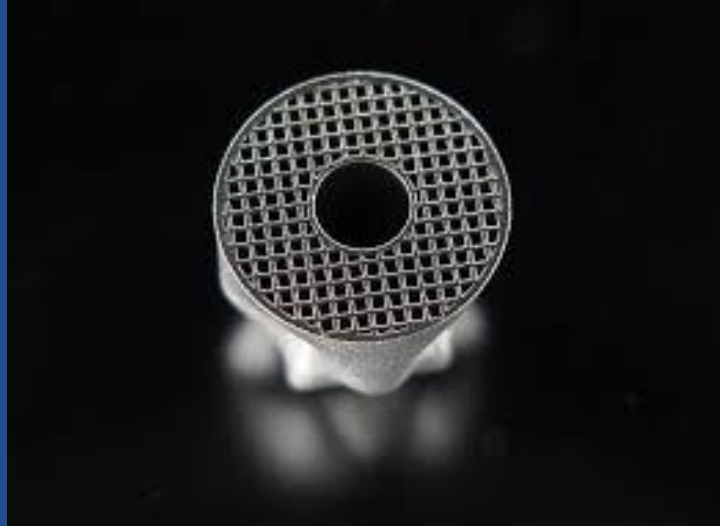
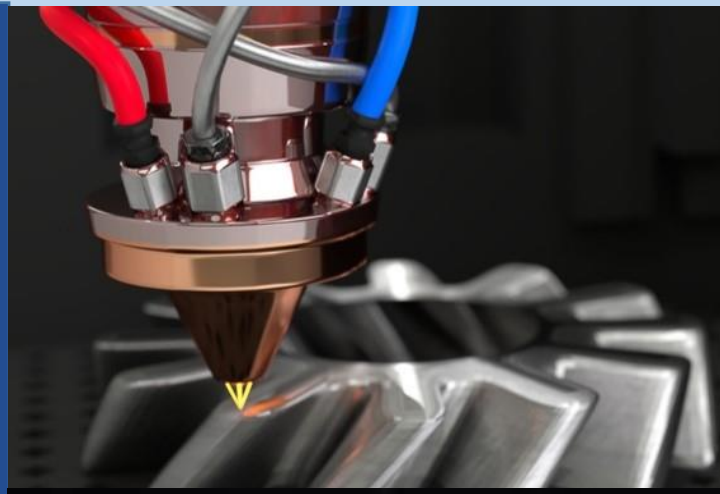
Master of Technology in Manufacturing Engineering



**Department of Mechanical
Engineering**



**National Institute of Technology
Karnataka Surathkal**



MANUFACTURING ENGINEERING

The Master of Technology program in Manufacturing Engineering was started in 1989. The program emphasizes fundamental principles of Manufacturing Engineering for various applications, including Materials Processing, Friction Stir Welding, Semi-Solid Processing of Composites, Thermal Spray Coatings, Severe Plastic Deformation, Advanced Materials Characterization, Micro-Machining, Laser Additive Manufacturing, and Nonconventional machining, etc. Students are also encouraged to do their projects in industries, wherever there are chances of exposure to various avenues in Manufacturing Engineering. The program has traversed the path of knowledge dissemination and generation and delivered efficient Manufacturing Engineering postgraduates to the nation.

VISION AND MISSION STATEMENT OF THE DEPARTMENT

VISION

To create globally competent mechanical engineers capable of working in an interdisciplinary environment, contributing to society through innovation, entrepreneurship, and leadership

MISSION

- 1) Produce Mechanical Engineers with a strong theoretical and practical knowledge to contribute to society with high moral and ethical values
- 2) Nurture students with a global outlook for a sustainable future and sound health
- 3) Enable to be productive members of interdisciplinary teams, capable of adapting to changing environments of engineering, technology, and society
- 4) Inculcate critical and deep-thinking abilities among students and develop entrepreneurial skills, innovative ideas, and leadership qualities
- 5) Create facilities for continued education, training, research, and consultancy

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO-1 Create globally competent manufacturing engineers with exposure to scientific and engineering aspects of product life cycle

PEO-2 Enable graduates with strong fundamentals and usage of appropriate engineering tools

PEO-3 Develop skills for integrated problem-solving, analysis and effective communication in a team-based environment

PEO-4 Create awareness of the societal impact and professional ethics

PROGRAM OUTCOMES (POs)

PO-1: An ability to independently carry out research/investigation and development work to solve practical problems

PO-2: An ability to write and present a substantial technical report/document

PO-3: Students should be able to demonstrate a degree of mastery over the area as per the specialization of the program. The mastery should be at a level higher than the requirements in the appropriate bachelor program

FACULTY (MANUFACTURING ENGG.)

**Prasad Krishna (PhD-University of Michigan)
Professor (HAG), (On Deputation, Director NIT
Calicut)**

Research Interests: Fluid Power Control Systems, Processing of Advanced Materials and Light Alloys, Modelling and Simulation of Solidification Processes, Characterization of Interfacial Heat Transfer in Permanent Mold Casting Processes.

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**Vijay H. Desai (PhD-NITK Surathkal)
Professor**

Research Interests: Composite Materials, Functionally Graded Materials, Machining, Sensors and Actuators, Manufacturing Processes

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Mail-id: desai@nitk.edu.in



**Kulkarni S.M. (PhD-IISc Bangalore)
Professor**

Research Interests: Processing and Characterization Composites and sandwiches, Mechatronics and MEMS systems, Product Development and Prototyping

Mobile: +91 99449086656

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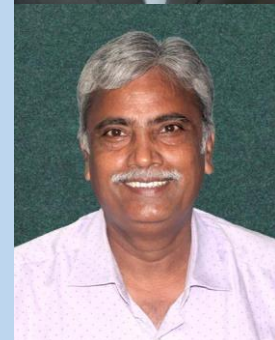


**Narendranath S. (PhD-IIT Kharagpur)
Professor**

Research Interests: Casting, Machining, Advanced welding, and Materials

Mobile: +919448793833

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H. Suresh Hebbar (PhD-IIT Delhi)

Professor

Research Interests: Machine Design, Composite Materials, Tribology, Fracture Mechanics

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H. Shivananda Nayaka (PhD-IIT Roorkee)

Associate Professor

Research Interests: Advanced Manufacturing Engineering, Severe Plastic Deformation, Accumulative Roll Bonding, Magnesium alloys

Mobile: +919449591543

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Ramesh M.R. (PhD-IIT Roorkee)

Associate Professor

Research Interests: Thermal Spray Coatings, Severe Plastic Deformation, Advanced Materials Characterization, Bio Fuels, FEA, Wear, Erosion, Oxidation & Hot Corrosion, Welding.

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Srikanth Bontha (PhD-Wright State University)

Associate Professor

Research Interests: Additive Manufacturing, Machinability of Titanium Alloys, Modelling of Manufacturing Processes

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Mrityunjay R. Doddamani (PhD-NITK Surathkal)

Assistant Professor (Associate Professor SMME, IIT Mandi - On LIEN)

Research Interests: Characterization of Materials/Composites Static and Dynamic, Functionally Graded Materials, Wear, Erosion, Optimization, FEM.

Mobile: +919448920878

Mail-id: mrdoddamani@nitk.edu.in



Sudhakar C. Jambagi (PhD-IIT Kharagpur)

Assistant Professor

Research Interests: Modern Manufacturing Processes
Thermally Sprayed Coatings, Green Composites

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Ranjeet Kumar Sahu (PhD-IIT Madras)

Assistant Professor

Research Interests: Micro/Nano Machining, Nano Materials
Synthesis & Characterization, Precision Engineering, Additive
Manufacturing, Advanced Welding

Mobile: +91-9182679250;

Mail-id: ranjeetsahu.j@nitk.edu.in



A.S.S. Balan (PhD-IIT Madras)

Assistant Professor

Research Interests: Precision Machining, Repair and
Remanufacturing, Surface Engineering, Additive
Manufacturing, Condition Monitoring

Mobile: +919789941487;

Mail-id: balan@nitk.edu.in



P.S. Suvin (PhD-IISc Bangalore)

Assistant Professor

Research Interests: Sustainable Manufacturing, Traditional
and Non-Traditional Machining, Tribology, Green Lubricants-
Synthesis and Testing of Eco-friendly cutting fluids.

Mobile: +91 8762785431

Mail-id: suvin@nitk.edu.in



COMPLETED R&D PROJECTS

1. FIST program on setting up of 'Composites Laboratory', Funding Agency: DST, Investigators: - S. M. Kulkarni and Vijay H. Desai.
2. Characterization of Tribological Properties of Polymer Composites Under Slider and Reciprocating Wear, Funding Agency: - MHRD, Investigator: - H. Suresh Hebbar.
3. Prototyping and Testing of bio-composites and composite lumber structural components, Funding Agency: MHRD, Investigator: - S. M. Kulkarni.
4. Investigation of machining characteristics of NiTi-based shape memory alloys using WEDM: DST-SERB: - S. Narendranath
5. Study of corrosion behaviour of Wrought Mg Alloys processed by Severe Plastic Deformation for Naval Applications: NRB: - S. Narendranath

ONGOING R&D PROJECTS

Sl. No.	(Principal Investigator/ Coordinator)	Project Title	Grant (INR) Lakhs	Funding Agency
1.	Dr. Mrityunjay Doddamani	An Investigation in to the Effects of Induced Helicity in The Carotid Bifurcated Arteries on Patient Specific Models	16.15	DST – SERB
2.	Dr. Sudhakar C Jambagi	Improvement In the Properties of Thermally Sprayed Hydroxyapatite Bio-Ceramic Coating Reinforced with Nanostructured Materials	38.4	DST – SERB
3.	Dr. A.S.S. Balan	Ultrafine Grain Refinement Through Low Plasticity Burnishing on WAAM of Mg alloy For Aerospace and Automotive Applications	16.01	SYST-SEED
4.	Dr. H Shivananda Nayaka	Experimental Technique to Induce Surface Grain Refinement Through Laser Shock Peening on ECAP Processed Mg Alloy.	41.02	DST-SERB
5.	Dr. Mrityunjay Doddamani and Srikanth Bontha	Development Of Composite Filament for Light Weight 3D Printed Components	33.03	DST-TSDP
6.	Dr. Mrityunjay Doddamani	Pre-Operative Damage Assessment in Orthopedic Surgery Using 3D Printing to Minimize Healing Time	5.0	VGST-GoK
7.	Dr. Mrityunjay Doddamani	Cost-Effective Enhanced Insulating Foams for Cold Storage Application	30.62	ISHRAE
8.	Dr. Mrityunjay Doddamani	Additive Manufacturing of Novel Structural Foam Composites For Durability And Damage Tolerance	86.49	SPARC
9.	Dr. Srikanth Bontha	Laser-based Additive Manufacturing of Ni-based Superalloy Components: Advancing Repair and Enhancement Technologies Using LMD Technique - A Simulation and Experimental Validation	26.4	ISRO
10.	Dr. Srikanth Bontha	Additive Manufacturing of Large Size Metal Components with Wire & Powder Hybrid Direct Energy Deposition (WP-DED) Process	17.34	DST-CRG

PROMINENT PUBLICATIONS

Sl. No.	Title	Journal	Author(s)
1.	Effect of Equal Channel Angular Pressing on Properties Evaluation of Biodegradable Mg-Zn-Mn Alloy	Journal of Bio- and Tribo-Corrosion, vol 7, no 69, 2021.	Ramesh S; Kumar G; Jagadeesh C; Anne G; Nayaka H.S
2.	Surface modification of multi-directional forged biodegradable Mg-Zn alloy by ball burnishing process: Modeling and Analysis using deep neural network	Journal of Manufacturing Processes, Vol 68, pages 423-434, 2022	Ramesh S, Anne G, Nagaraj Bhat, Aithil G, Nayaka H.S, Arya S.B

3.	Flexural response of 3D printed sandwich composite	Composite Structures, vol 263, page 113732,2022	Bonthu D; Gururaja S; Prabhakar P; Doddamani M
4.	Compressive behaviour of 3D printed MWCNT/HDPE nano-composites	Composite Communications, vol 35, page no. 101317, 2022	Kumar S, Ramesh MR, Doddamani M
5.	Solid Particle Erosion Behavior of Partially Oxidized Al with NiCr Composite Coating at Elevated Temperature	Journal of Materials Engineering and Performance, 2021	Subba Rao M; and Ramesh M.R; Ravikiran K
6.	Design and characterization of pneumatic muscle actuator with novel end-fittings for medical assistive applications	Sensors and Actuators A: Physical, 2022	Carvalho A.R, Karanth N, Desai V
7.	Free vibration analysis and selection of composite for high strength and stiffness using multi-attribute decision making	International Journal of Materials Research, vol 112, pp 189-197, 2021.	Allien V; Kumar H; Desai V
8.	Recent progress in equal channel angular, angular pressing of magnesium alloys from Segal's idea to advancements till date- A review	International Journal of Light Weight Materials and Manufacture, 2022	Sekar P, Naik G.M, Narendranath S, Desai V
9.	Machining and forecasting of square profile areas using artificial neural modelling at different slant angles by WEDM	Materials Science and Engineering, vol 1065, no 12011, 2021.	Manoj I.V; and Narendranath S
10.	Novel application of graphite-talc hybrid nanoparticle enriched cutting fluid in turning operation	Journal of Manufacturing Processes; vol 62, pp 378-387, 2021	Singh V; Sharma A.K; Sahu R.K; Katiyar J.K
11.	Experimental investigation of machining characteristics of titanium processed using electrolyte sonicated μ -ECDM system	Nature Scientific Reports; vol 12, pages 1-18, 2022	Bhargav KVJ, Balaji P.S, Sahu R.K, Leblouba M
12.	Effect of surface treatment of cenospheres on the mechanical properties of cenosphere/recycled PET composites	Surface Engineering; pages 192-204, 2022	Prabhu B.K, Kulkarni SM, Joshi A.G
13.	Development of sustainable Jute/Epoxy composite and assessing the effect of rubber crumb on low-velocity impact response	Journal of Natural fibres, pages 1-12, 2022	Mahesh Vishwas, Mahesh Vinyas, Harursampath D, Joladarshi S, Kulkarni SM
14.	Effect of Zinc and Bio Glass addition on mechanical properties and corrosion behaviour of Magnesium based composites for orthopaedic application: A preliminary study	Journal of Mechanical Engineering and Performance, pages 1-25, 2022	Moudgalya K.V, Sekar P, Hebbar S, Rahman M.R
15.	Tailoring surface characteristics of bioabsorbable Mg-Zn-Dy alloy using friction stir processing for improved wettability and degradation behaviour	Journal of Materials Research and Technology, vol. 12, pp. 1530–1542	U. Rokkala, S. Bontha, M. R. Ramesh, V. K. Balla, A. Srinivasan, S. V. Kailas

16.	Evaluation of a comprehensive non-toxic, biodegradable, and sustainable cutting fluid developed from coconut oil	Journal of Engineering Tribology, vol. 235, no. 9, pp. 1842–1850, 2021	P. S. Suvin, P. Gupta, J.-H. Horng, S. V. Kailas
17.	Articulated Robotic Arm for feeding	Industry 4.0 and Advanced Manufacturing, 3-12, 2023	Nair A, Rajendran D, Jacob J.C, Varghese N.S, Suvin P.S
18.	4D printed stereo lithography printed plant-based sustainable polymers: Preliminary investigation and optimization	Journal of Applied Polymer Science, vol. 138, no.36, 2021	M. Danish and A.S.S Balan
19.	Grinding parameters prediction under different cooling environments using machine learning techniques	Materials and Manufacturing Processes, pages 1-10, 2022	Prashanth G.S, Sekar P, Bontha S, A.S.S Balan
20.	Influence of weave pattern and composite thickness on mechanical properties of bamboo/epoxy composites	Materials Research Express, Volume 6, Number 12, DOI: 10.1088/2053-1591/ab5a90, 2019	Gangadhar M K, Hebbar S and S M Kulkarni

MAJOR FACILITIES	MAJOR LABORATORIES
<ul style="list-style-type: none"> ➤ 25-ton Hydraulic Press ➤ CAD Lab ➤ Software: AUTOCAD, ANSYS, ADAMS, DEFORM, EES, NIST-REFPROP, SIMPACK ➤ Injection Molding Equipment ➤ Pin on Disc wear testing Machine ➤ Universal Tensile Testing Machine ➤ Vickers Microhardness Tester ➤ Vacuum Arc Melting Furnace ➤ Wire-Electric Discharge Machine ➤ Microwave Welding Furnace ➤ Rolling Machine ➤ Electro Chemical Corrosion Setup ➤ Optical Microscope ➤ Muffle Furnace ➤ Laser Shock Peening ➤ Ball Burnishing 	<ul style="list-style-type: none"> ❖ Machine shop I & II ❖ CAD/CAM laboratory ❖ CNC Machine Tools Laboratory ❖ Materials characterization laboratory ❖ Metrology Laboratory

BOOKS PUBLISHED

Sl. No.	Title	Journal	Author(s)
1.	Corona Discharge Micromachining for the Synthesis of Nanoparticles: Characterization and Applications	1st Edition, Print ISBN - 9780367224738; eBook ISBN – 9781000065404, DOI: 10.1201/9780429275036, CRC Press, Taylor & Francis, Boca Raton, New York, 2019.	R.K Sahu, Somashekhar S. Hiremath
2.	Modern Manufacturing Technology: Spotlight on Future	1 st Edition, Print ISBN – 9781032066394; DOI: 10.1201/97 CRC Press, Taylor & Francis, Boca Raton, New York, 2021.	Katiyar J.K, R.K. Sahu

PATENTS PUBLISHED

Sl. No.	Title	Issue Date	Author(s)
1.	Method for Generation of Nanoparticles using Advanced Mechanical Micro-Machining Technique	4294/CHE/2014, Awarded on September 29, 2020.	Ranjeet Kumar Sahu, Somashekhar S. Hiremath
2.	Cutting Tool with Error Proofing Feature	US 2011/0076106 A1, Awarded, March 31, 2011	Morrison, G.M., Bontha, S., Seculi, J., Long, T.J., Verellen, J.J., and Iyer, R
3.	Cutting Tool Having Coolant Delivery System for Providing Cutting Fluid in a Fan-Like Pattern	US 2010/0239377, Awarded, September 23, 2010	Morrison, G.M., and Bontha, S
4.	Double-Sided Ball End Mill Cutting Insert and Tool.	US 2010/0124465 A1, Awarded, May 20, 2010	Morrison, G.M., and Bontha, S

CONSULTANCY POTENTIAL

- Analysis of Machining Processes (turning, milling, grinding, and other Non-traditional Machining processes)
- Solidification Processing
- Metal Additive Manufacturing
- Computer-Aided Modelling and Analysis
- Surface Metrology and Instrumentation
- Error compensation of CNC Machines
- Micro Manufacturing
- Wear and Tribological Studies



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