



# DEPARTMENT OF METALLURGICAL AND MATERIALS ENGINEERING

National Institute of Technology Karnataka, Surathkal

Post Srinivasnagar, Mangalore, Karnataka, India, 575025

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### ▪ **Institute Vision**

To facilitate transformation of students into good human beings, responsible citizens and competent professionals, focusing on the assimilation, generation and dissemination of knowledge.

### ▪ **Institute Mission**

- Impart quality education to meet the needs of profession and society, and achieve excellence in teaching-learning and research.
- Attract and develop talented and committed human resources, and provide an environment conducive to innovation, creativity, team-spirit and entrepreneurial leadership.
- Facilitate effective interactions among faculty and students, and foster networking with alumni, industries, institutions and other stake-holders.
- Practice and promote high standards of professional ethics, transparency and accountability.

### ▪ **Profile of the Department**

The Department of Metallurgical and Materials Engineering, one of the oldest Departments at National Institute of Technology, Karnataka was established in the year 1965 with an objective to impart education and training in Metallurgical and Materials Engineering.

The department owes a lot to the vision of its founder Head, Prof. T. Ramchandran. The department is very active in research activities and keeps abreast with the state-of-the-art developments in Engineering and Technology.

The department offers one UG program, three PG programs, master's by research, and Ph.D. The students are given intensive training in conventional metallurgy, involving both practical and theory. Starting with basic subjects, students are taught application-oriented courses. The curriculum includes advanced topics in Metallurgy and Materials Engineering. Apart from undergoing industrial training, students are required to carry out the project work as part of their curriculum. Our alumni are employed in various fields, such as industries, academia, R&D institutes, government, and public sector organizations.

The department has been active in carrying out funded R&D projects and many facilities for research have been added in recent years. The department has shown strong presence in the areas of corrosion, physical metallurgy, solidification, quenching, powder metallurgy, electrospinning of polymeric and ceramic nanofibers, metal joining and forming. Some of the advanced facilities include TEM, SEM, XRD, FTIR spectrometer, contact angle meter and optical microscopes. Metallurgical and Materials Engineering Association (MMEA) takes care of various students' activities of the department and brings out an in-house magazine NITKAST.

The department library holds about 750 text books, back volumes, and journals. The department has an excellent academic atmosphere with qualified and motivated young faculty and hard-working staff. The Surathkal Chapter of the Indian Institute of Metals (IIM) regularly conducts technical meetings, workshops, industrial tours, and visits for enriching the technical knowledge of students. During the last 54 years about 1420 graduates, 880 post graduates and 58 Ph.D. scholars have graduated from this department and have occupied positions of eminence in industries, R&D organizations, and academic institutions.

▪ **Department Vision**

To transform students to competent professionals in the area of Metallurgical & Materials Engineering through excellence in pedagogical training and research so that they could become leaders in designing, building, and operating associated plants, as well as in R & D and academia.

▪ **Department Mission**

- To impart the knowledge of fundamentals and complex engineering problems and solutions in the field of metallurgy and materials using modern tools
- To interact with neighbouring industries and extend to them the expertise as and when needed for testing, consultancy, and other developmental work
- To generate data and enhance knowledge in metallurgical and materials engineering through independent research work
- To support the administration for the overall development of the department and implement Institute ethics, transparency, and accountability

▪ **Faculty**

<p><b>Head of the Department</b>  <b>Dr. Ravishankar K.S.</b></p> <hr/> <p><b>Established: 1965</b></p> <hr/> <p><b>Students</b></p>		<p><b>Professors</b></p> <p>Dr. K. Narayan Prabhu      knprabhu</p> <p>Dr. Jagannatha Nayak      jagan</p> <p>Dr. Udaya Bhat K.      udayabhatk</p> <p>Dr. Anandhan Srinivasan      anandhan</p> <hr/> <p><b>Associate Professors</b></p> <p>Dr. Kumkum Banerjee      kumkum</p> <p>Dr. Ravishankar K.S.      rshankar983</p> <p>Dr. M. Rizwanur Rahman      rizwan</p> <p>Dr. Preetham Kumar G.V.      preethamk11</p> <p>Dr. Subray R. Hegde      hegdesr</p> <hr/> <p><b>Assistant Professors</b></p> <p>Dr. Shashi Bhushan Arya      sbarya</p> <p>Dr. Saumen Mandal      smandal</p> <p>Dr. B. Rajasekaran      b.rajasekaran</p> <p>Dr. Sumanth Govindarajan      sumanthg</p> <p>Dr. Selvakumar Murugesan      murugesan_selva</p> <hr/>												
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▪ **Degrees and Programmes**

- B. Tech in Metallurgical and Materials Engineering
- M. Tech in Process Metallurgy
- M. Tech in Materials Engineering
- M. Tech in Nanotechnology
- M. Tech (By Research)
- Ph.D. in Metallurgical Engineering

▪ **Program Outcomes (POs)**

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues, and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.



▪ **Program Specific Outcomes (PSOs)**

- Quality professionals in metallurgical and materials engineering who fulfil the educational objectives of the program and meet the missions of the Institute and the Department.
- Motivated professionals who can become leaders, researchers, innovators, entrepreneurs and contribute to the society and nation

▪ **Program Educational Objectives (PEOs)**

- To train personnel in the area of metallurgical & materials engineering who can be leaders in designing, building, and running of metallurgical plants required for the country as well as in R&D activities
- To motivate graduates to take up entrepreneurship in areas related to metallurgical and materials engineering
- To motivate graduates to become good human beings, responsible to the overall welfare of the society



- **Current Research Projects**
  - Realization of Al Alloy AA2219/AA2014 Integrally Stiffened Cylindrical Structure through flow forming
  - Prawn shell-derived natural protein – based highly efficient UV protection coating for drug products
  - To study the effect of interfacial heat flux during WAAM on the microstructural, distortion and mechanical properties of aluminium alloy
  - Mitigating Dendrite growth using engineered electrolyte layers for the development of high energy density, long cycle life lithium batteries
  - Life extension of K-Type thermocouples
  - Development of antimicrobial active surfaces for health care applications

- **Publications**

Journals: 877

- **Basic Metallurgical Tools**

Tensile tester	Universal Testing Machine
Wear Testing Machine	Impact Testing Machine
Mold-making Facility	Induction Melting
Hardness Testers - Rockwell & Brinell	High temperature furnaces

- **Material Processing and Synthesis**

Electrolysis Facility	Electroplating System
Electrospinning Equipment	Vacuum Oven
Ultrasonicator Bath	Screen printer
Spin coater	Probe Sonicator

- **Material Characterization**

Transmission electron microscope (TEM)  
 Scanning electron microscope (SEM)  
 Optical microscopes  
 X-ray diffractometer (XRD) equipped with high temperature stage  
 Differential scanning calorimeter (DSC)  
 Fourier Transform Infrared Spectrometer (FTIR)  
 Rheometer, Surface profiler, Contact Angle Analyzer, Bond Tester

- **Contact Information**

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