National Institute of Technology Karnataka, Surathkal
Department of Mechanical Engineering
ABOUT MANUFACTURING ENGINEERING GROUP

The Master program in Manufacturing Engineering was started in the year of 1989. The program emphasizes on fundamental principles of Manufacturing Engineering for various applications, which includes materials processing, Friction Stir Welding, Semi solid processing of composites, Thermal Spray Coatings, Severe Plastic Deformation, Advanced Materials Characterization, micro-machining, 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 as well as delivered more than 200 Manufacturing Engineering post graduates to the nation.

PROGRAM EDUCATIONAL OBJECTIVES

- Create globally competent manufacturing engineers with exposure to scientific and engineering aspects of product life cycle.
- Create sustained interest in science and latest technologies of manufacturing.
- Enable graduates with strong fundamentals and usage of appropriate engineering tools.
- Develop skills for integrated problem solving, analysis and effective communication in a team-based environment.
- Create awareness of societal impact and professional ethics.

PROGRAM OUTCOMES

a. Graduates will demonstrate ability to formulate and solve manufacturing related problems by applying fundamental principles.
b. Graduates will demonstrate the ability to design and conduct experiments, Interpret and analyzes data and report results.
c. Graduates will demonstrate the ability to design and develop a manufacturing system or a process.
d. Graduates will be able to independently analyse complex problems with their course background and dissertation work carried out during program.
e. Graduates will be familiar with CAD, CAE and PLM tools for manufacturing applications.
f. Graduates will have the confidence to apply engineering solutions in global and societal contexts.
g. Graduates will have the ability to design and evaluate a manufacturing system/process which is environment friendly with appropriate consideration for public health and safety.
h. Graduates will demonstrate an understanding of their professional ethical responsibilities.
i. Graduates will demonstrate the ability to function effectively individually, also as a team member in multidisciplinary activities.
j. Graduates will be able to communicate effectively in both verbal and written forms.
k. Graduates will be capable of self-education and clearly understand the value of lifelong learning in continuing professional development.
1. Graduates will have the ability to employ effective project management skills to develop a project plan.

**FACULTY MEMBERS (MANUFACTURING ENGG.)**

<table>
<thead>
<tr>
<th>Name</th>
<th>Designation</th>
<th>Research Interests</th>
<th>Contact Details</th>
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Mail-id: krishnprasad@gmail.com |
Mail-id: vijayhdesai64@gmail.com               |
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| Mervin A. Herbert, Ph.D. (IIT Kharagpur) | Assistant Professor     | Friction Stir Welding, Semi solid processing of composites, applications of Artificial Neural Network | Mobile: +91481213227  
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| H. Shivananda Nayaka, Ph.D. (IIT Roorkee) | Assistant Professor    | Advanced Manufacturing Engineering, Severe Plastic Deformation, Accumulative Roll Bonding, Magnesium alloys | Mobile: +919449591543  
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| Srikanth Bontha, Ph.D. (Wright State University) | Assistant Professor | Additive Manufacturing, Machinability of Titanium Alloys, Modelling of Manufacturing Processes | Mobile: +919482606482  
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| Mrityunjay R. Doddamani, Ph.D. (NITK Surathkal) | Assistant Professor | Syntactic foams, Additive manufacturing of advanced materials and Medical implants, Mechanical characterization of composites. | Mobile: +91448920878  
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CURRENT RESEARCH AREA

- Composite Materials, Tribology, Fracture Mechanics
- Additive Manufacturing of Advanced Materials and light alloys
- Dynamic Analysis of Polymer Composite Structures
- Thermal Spray Coatings, Severe Plastic Deformation, Advanced Materials Characterization,
- Severe Plastic Deformation, Accumulative Roll Bonding
- Biomechanics Green Composites
- Friction Stir Welding, Semi solid processing of composites
- Advanced Manufacturing, Machining Processes, Process Modelling Based on Numerical, Artificial Intelligence Techniques and Solidification Processing

Completed R&D Projects

1. FIST program on setting up of ‘Composites Laboratory’, Funding Agency: DST, Investigators: - S. M. Kulkarni and Vijay H. Desai.

Ongoing R&D Projects

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Principal Investigator/ Coordinator</th>
<th>Project Title</th>
<th>Grant (INR) Lakhs</th>
<th>Funding Agency</th>
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<tbody>
<tr>
<td>1.</td>
<td>Mrityunjay Doddamani</td>
<td>Additive Manufacturing of Composite</td>
<td>33.03</td>
<td>DST</td>
</tr>
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<td>2.</td>
<td>Narendranath S.</td>
<td>Study of corrosion behavior of wrought Mg Alloys processed by severe plastic deformation for naval applications</td>
<td>23</td>
<td>NRB</td>
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<tr>
<td>No.</td>
<td>Name</td>
<td>Project Description</td>
<td>Funding Agency</td>
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<td>3</td>
<td>Narendranath S.</td>
<td>Investigation of machining characteristics of TiNi based Shape Memory alloy using Wire-EDM</td>
<td>16.32 DST – SERB</td>
<td></td>
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<tr>
<td>5</td>
<td>Ramesh M. R.</td>
<td>Development of HVOF sprayed cermets coatings in improving resistance to hot corrosion and erosion of gas turbine alloys</td>
<td>18.1 AICTE</td>
<td></td>
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</tbody>
</table>

**Major Facilities**
- 25 ton Hydraulic Press
- CAD Lab
- Softwares: AUTOCAD, ANSYS, ADAMS, DEFORM, EES, NIST-REFPROP, SIMPACK
- Injection Moulding Equipment
- Pin on Disc wear testing Machine

**Major Laboratories**
- Machine shop I & II
- CAD/CAM laboratory
- CNC Machine Tools laboratory
- Materials characterization laboratory
- Lightweight Materials Lab.
- Additive Manufacturing Lab.

**Consultancy Potential**
- Analysis of Machining Processes (turning, milling, grinding, shearing and sheet metal forming)
- Materials Characterization, Solidification Processing, Additive Manufacturing
- Computer Aided Modelling and Analysis, Error compensation of CNC Machines

**MoUs with Industries and Research labs**
1. Larsen & Toubro Limited (L&T Construction)
2. AB Volvo Group Sweden
3. Robert Bosch Engineering and Business Solutions Limited (RBEI), Bangalore
4. Mercedes-Benz Research and Development Indian Private Limited (MBRDI), Bangalore
5. Oil and Natural Gas Corporation Limited (ONGC), Dehradun
6. Mangalore Refinery and Petrochemicals Limited (MRPL)
7. Institut National DE LA Recherche Agronomique (INRA), France
8. CSIR- National Institute of Oceanography, Goa
9. Bhabha Atomic Research Center (BARC), Mumbai
10. National Aerospace Laboratories (NAL), Bangalore
11. Central Power Research Institute (CPRI), Bangalore
12. Central Manufacturing Technology Institute (CMTI), Bangalore
Awards

- Review Paper on non-ferrous metals Ranked 3rd in List of top 25 downloaded article in Elsevier (Science direct) of M. Manjaiah and Narendranath S.

Selected Publications (2015-16)

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Author(s)</th>
<th>Title</th>
<th>Journal (Volume, Year, Pages)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Steven Eric Zeltmann, B. R. Bharath Kumar, Mrityunjay Doddamani, and Nikhil Gupta</td>
<td>Prediction of strain rate sensitivity of high density polyethylene using integral transform of dynamic mechanical analysis data</td>
<td>Polymer, 101, 2016, 1-6</td>
</tr>
<tr>
<td>6.</td>
<td>Venkatesh Ganta, K. Srinivasasagar, D Chakradhar</td>
<td>Multi objective optimization of thermally enhanced machining parameters of Inconel 718 using grey relation analysis</td>
<td>International journal of Machining and Machinability of Materials, 2015 (Accepted)</td>
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