

THERMAL ENGINEERING



DEPARTMENT OF MECHANICAL ENGINEERING



**NATIONAL INSTITUTE OF TECHNOLOGY KARNATAKA, SURATHKAL
P.O. SRINIVASNAGAR, MANGALORE- 575 025, KARNATAKA, INDIA**

VISION AND MISSION STATEMENT OF THE DEPARTMENT

VISION

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

ABOUT THERMAL ENGINEERING GROUP

The first Master program in the department was started in Heat Power Engineering in the year of 1971, and it was renamed as M. Tech. in Thermal Engineering in the year of 2008. The Program emphasizes on fundamental principles of Thermal Engineering for various applications, which includes Theory and design of internal combustion engines, Computational fluid dynamics, Measurement in thermal systems, Advanced fluid mechanics, Combustion, Refrigeration and Cryogenics, Air-Conditioning Systems, Turbo machines, Renewable & Sustainable energy, etc. Students are also encouraged to do their projects in industries, wherever there are chances of exposure to various avenues in Thermal Engineering. The program has traversed the path of knowledge dissemination and generation as well as delivered more than 600 Thermal Engineering post graduates to the nation.

PROGRAM EDUCATIONAL OBJECTIVES

- ✦ Prepare graduates with good analytical, computational and experimental skills to design and develop energy efficient systems for sustainable development
- ✦ Prepare graduates with technical competency combined with research and complex problem solving ability to generate innovative solutions in thermal engineering
- ✦ Pursue lifelong learning for career and professional growth with a concern for society and environment
- ✦ Inculcate teamwork, communication and interpersonal skills adapting to changing environments of technology

PROGRAM OUTCOMES

- An ability to independently carry out research/investigation and development work to solve practical problems
- An ability to write and present a substantial technical report/document
- 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 MEMBERS (THERMAL ENGINEERING)

Ravikiran Kadoli, Ph.D. (IIT Madras)

Professor

Research Interests:

Structural mechanics, Mechanics and applications of advanced materials, Fluid- Structure Interaction and other coupled problems like heat and mass transfer, Computational dynamics.

Mobile: +919844400659

Mail-id: rkkadoli@nitk.edu.in



Kumar G.N., Ph.D. (IIT Delhi)

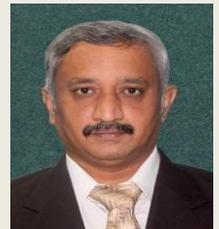
Professor

Research Interests:

Alternative fuels for IC engines, Simulation of I.C. engines, Heat Transfer

Mobile: +919481848572

Mailid: gnkumar33@nitk.edu.in



Veershetty Gumtapure, Ph.D. (IIT Madras)

Professor

Research Interests:

Renewable energy, Solar energy conversion

Mobile: +919591415911

Mail-id: veersg@nitk.edu.in



Sathyabhama A., Ph.D. (NITK Surathkal)

Professor

Research Interests:

Heat transfer, Refrigeration & Air-conditioning, Energy sources, Energy Audit

Mobile: +919448134433

Mail-id:

sathyabhama@nitk.edu.in



Anish S., Ph.D. (IIT Madras)
Professor

Research Interests: CFD, Turbomachines, Aerodynamics, Biomedical flows, Solar energy

Mobile: +919036317552

Mail-id: anish@nitk.edu.in



Arun M., Ph.D. (University of Greenwich)
Professor

Research Interests: CFD, Turbulence, Heat and mass transfer, Combustion, Multi-phase flows, Fire safety engineering

Mobile: +917795541824

Mail-id: m.arun1978@nitk.edu.in



Vasudeva M., PhD. (IIT Bombay)
Associate Professor

Research Interests:

Gasification of biomass for power and CHP, Polygeneration, Environmental impacts and Sustainability assessment of bioenergy

Mobile: +919008889796

Mail-id: vasu@nitk.edu.in



Ajay Kumar Yadav, Ph.D. (IIT Kharagpur)
Assistant Professor (On Lien- IIT Patna)

Research Interests: Heat transfer, Refrigeration & Air Conditioning, Renewable energy, Bio-fuels, IC Engines, CFD, Bioheat transfer

Mobile: +919035552339

Mail-id: ajaykyadav@nitk.edu.in



N. Gnanasekaran, Ph.D. (IIT Madras)
Associate Professor

Research Interests:

Inverse Heat Transfer, Optimization in thermal systems

Mobile: +917204877348

Mail-id: gnanasekaran@nitk.edu.in



Arumuga Perumal D, Ph.D. (IIT Guwahati)
Associate Professor

Research Interests: Lattice Boltzmann method, CFD, Microfluidics (MEMS) and Numerical heat transfer.

Mobile: +919159860535

Mail id: perumal@nitk.edu.in



Ranjith M, Ph.D. (Dong-A University, Busan, South Korea)
Associate Professor

Research Interests: CFD, Fluid-structure interaction, Microfluidics, Biofluidynamics, Solar energy

Mobile: +918050159645

Mail-id: mranji1@nitk.edu.in



Parthasarathy, Ph.D. (KIT Germany)
Assistant Professor

Research Interests:

Fluid flow and heat transfer in porous media, Porous media injectors for cryogenic engines, Solar fuels.

Mobile: +917204877348

Mail-id: parthasarathy@nitk.edu.in



CURRENT RESEARCH AREA

- Emission Studies on Engines, Combustion of Premixed Flames
- Microchannel Flows
- Multi-Phase flow, Nanofluids
- Computational Fluid Dynamics
- Alternate Refrigerants and Alternate Refrigeration Methods
- Alternate Fuels
- Renewable Energy Systems, Solar Energy, Wind Energy
- Natural Circulation Loops
- Inverse Heat Transfer, Pool Boiling
- Turbomachines
- Lattice Boltzmann Method
- Immersed Boundary Method
- Microfluidics, Biological Fluid dynamics

CONSULTANCY POTENTIAL

- ✚ Engine Performance Testing, Combustion
- ✚ Refrigeration and Air Conditioning System
- ✚ Microchannels Flow, Cryogenics, CFD
- ✚ Heat Transfer, Turbomachinery
- ✚ Renewable Energy Systems, Energy Auditing

FACILITIES

Major Facilities

- Liquid Nitrogen Plant with Nitrogen Generator
- 3D Particle Image Velocimetry, Micro PIV
- Computerized IC Engine Test Rigs
- Emission Testing Equipment
- Ref. & A/C Test Equipment, Simulation Chamber
- Pool Boiling Setup
- CRDI Engine
- Solar Simulator with Thermal Collectors
- Wind Tunnel
- Optical Microscope

Major Laboratories

- ❖ Heat Transfer Laboratory
- ❖ I.C. Engines Laboratory
- ❖ CFD Laboratory (ANSYS 14.5, EES, NIST-REFPROP, AVL FiRE & BOOST, COMSOL)
- ❖ Wind Turbine Laboratory

ONGOING PROJECTS

Sl. No.	(Principal Investigator/ Coordinator)	Project Title	Grant (INR) Lakhs	Funding Agency
1	Dr. Ranjith M	Investigations on inertial migration dynamics of aerosol particles	25.20	DST-SERB
2.	Dr.Vasudeva Madav	Food waste to hydrogen	35.20	Maire Tecnimont S.p.A, Italy
3.	Dr. N. Gnanasekaran	Design of concentrated solar receiver tube using inverse thermo-elastic analysis for improved efficiency and safe operation of solar power plants	26.05	DST-SERB
4	Dr. Arun M	Smart electric vehicle supply equipment with improved re-configurability, economic, availability and performance (REAP)	60	DST-SERB
5.	Dr. Parthasarathy P	Design and testing of robust, highly efficient, low polluting LPG porous burners for household applications.	25.85	DST-SYST
6.	Dr.Vasudeva Madav	Generation of design data for condenser of vapor compression module (VCM) of AMCA	91.15	Aeronautical Development Agency, Bangalore
7.	Dr. Vasudeva Madav	Feasibility studies analysis for the implementation of an organic waste based biogas plant in Paradip: Odisha project management	27.02	DST-SERB
8.	Dr. Arun M	Particle migration and margination in bidspersed fluid flow through constricted channel	30	DST-SERB
9.	Dr.A. Sathyabhama	Development of ternary mixture based solar absorption refrigeration system	15	VGST Karnataka
10.	Dr.Vasudeva Madav	Experimental investigation and optimization of green hydrogen production using biomass (RDF) and redmud catalyst	12.53	Tecimont Private Limited
11.	Dr.Vasudeva Madav	Modeling and experimental studies on catalytic steam biogas reforming process for hydrogen generation	38.65	Petronet LNG Limited

SELECTED TOP PUBLICATIONS

Sl. No.	Title	Journal	Author(s)
1.	A comparative study of nox mitigating techniques egr and spark delay on combustion and nox emission of ammonia/hydrogen and hydrogen fuelled si engine	Energy, 2023	JK Pandey, MH Dinesh, GN Kumar
2.	Experimental and numerical investigation of pool boiling heat transfer from finned surfaces	Applied Thermal Engineering, 2023	Rajan Jaswal, A. Sathyabhama, Kuldeep Singh, A.V.V.R. Prasad Yandapalli
3.	Effect of ribs/fins and aspect ratio on flow boiling characteristics in conventional channels	ASME Journal of Thermal Science and Engineering Applications, 2024	K. Madan, A. Sathyabhama,
4.	Experimental investigation of variable compression ratio and ignition timing effects on performance, combustion, and nox emission of an ammonia/hydrogen-fuelled si engine	International Journal of Hydrogen Energy, 2023	MH Dinesh, GN Kumar
5.	Experimental investigation on additive manufactured single and curved double layered microchannel heat sink with nanofluids	Heat and Mass Transfer, 2023	G Narendran, B Mallikarjuna, BK Nagesha, N Gnanasekaran
6.	Thermal resistance of open-cell metal foam with thermal interface materials (tim)	Applied Thermal Engineering, 2023	P Ganesan, F Zaib, T Zaharinie, M Mobedi, N Gnanasekaran
7.	Experimental investigation on thermal stability of dual particle magnetorheological fluid and performance	Heat Transfer Engineering, 2023	Kariganaur, A. K., Kumar, H., & Arun, M.
8.	Numerical assessment of stability behaviour in supercritical CO ₂ based ncls configured with heater, heat exchanger and isothermal wall as heat sources	Journal of Thermal Engineering, 2023	Thimmaiah, S., Wahidi, T., Yadav, A.K. and Arun M.
9.	Performance prediction model development for solar box cooker using computational and machine learning techniques	ASME Journal of Thermal Science and Engineering Applications, 2023	B. C. Anilkumar, R. Maniyeri, S. Anish
10.	Control force and inertial migration in Poiseuille flow: a computational study	Particulate Science and Technology, 2023	M. P. Neeraj, R. Maniyeri
11.	Comparative studies on air, water and nanofluids based Rayleigh Benard natural convection using Lattice Boltzmann Method: CFD and exergy analysis	Journal of Thermal Analysis and Calorimetry, 2022	Pawan Karki, D.Arumuga Perumal, Ajay Kumar Yadav

CONTACT

Prof. S M Murigendrappa,
Professor and Head
Department of Mechanical Engineering
National Institute of Technology Karnataka, Surathkal
Post Srinivasnagar, Mangalore – 575025, Karnataka, INDIA
Phone: +91-824-2473049
Fax: +91-824-2474058
Email: hodmechanical@nitk.edu.in

