

M.Tech in Thermal Engineering

Thermal Engineering programme deals with the science of fluid mechanics, thermodynamics, heat and mass transfer. The programme allows a compressive study in the advances in controlling heating or cooling processes in an enclosed environment or an open environment using various equipment, real-time applications of fluid flow and heat transfer in Thermal energy systems. The programme deeply concerns with the aspects of energy, alternative source of energy, mathematical modelling, design, development and analysis, optimization, entrepreneurship and management, flows, combustion and emissions etc.

Scheme & Syllabus

The detailed revised syllabus is available in the following link.

http://www.nits.ac.in/departments/mech/syllabus/Course_MTech_Design_and_Manufacturing.pdf

Objectives & Activities:

- The students will study latest subjects in the fields of Thermal engineering with an ability to identify, formulate and solve thermal engineering problems.
- To provide hands on experience to the students on the state-of-the-art knowledge-oriented conceptualize designs of thermal system or component and evaluate them to select optimal feasible solution considering safety, environment and other realistic constraints.
- The students will demonstrate skills to use modern engineering tools, software and equipment to analyze and solve complex engineering problems.
- To develop the competency in the research activity to address the recent challenges in the industry and society.

Career Scope:

- Core companies in commercial construction, Agriculture, and Heating Ventilation, Cooling industry, Defence and automotive manufacturing sectors.
- Software companies dealing in product design, development and application.
- Research and Development Organisations.

Eligibility Criteria:

As per CCMT (Centralized Counselling for M.Tech./M.Arch./M.Plan. Admissions) guidelines.

In addition under sponsored category also, admission may also be taken.

Course Duration:

- The duration of the course is 2 years comprising of 4 semesters
- First two semesters contains class work and labs.

- Third and fourth semesters have in-house R & D project work.

Facilities:

- High end computational facilities available for lab work and research purpose
- Hands on training are available on sophisticated machinery.
- Financial support for project/research work through institute, department, TEQIP III funds.
- Central T&P cell enable opportunities for job placement

List of laboratories and major equipment:

- **Computational Lab:** Major software are available for computational analysis like ANSYS 14, Fluent, Pro-E etc. with latest Computer terminal.
- **I C Engines Lab:** Furnished with computerised 3 cylinder 4 stroke water cooled MPFI petrol Engine Test setup, Computerised 4 cylinder 4 stroke Turbo Charger water cooled Diesel Engine Test setup.
- **Heat Transfer:** Equipped with computerized Heat pipe demonstrator unit, Unsteady state heat transfer unit, Shell & Tube Heat Exchanger, emissivity measurement, Pin Finned Apparatus, Cross Flow Heat Exchanger, Finned Tube Cross Flow Heat Exchanger, (Condensation unit, Convective Heat Transfer in Air flow under process), etc.
- **Fluid Machinery Lab:** Centrifugal Pump Test Rig, Francis Turbine, Hydraulic Ram, Pelton Turbine, Subsonic Wind Tunnel.
- **Refrigeration & Air-conditioning Lab:** Furnished with air conditioning test rig, Computerized cascade refrigeration system with data acquisition & PLC board (KTENG, Korea make), Computerized air handling system with data acquisition & PLC board (KTENG, Korea make), Computerized Vapour absorption Refrigerator Test rig, Vortex tube Refrigeration test rig, Vapour Compression Refrigeration Testing, A.C Parameter measuring Devices.
- **Thermodynamics Lab:** Gas Turbine power plant (Didacta Italia make)
- **Energy Research Lab:** Computerised Single Cylinder 4 stroke water cooled multi fuel VCR Engine setup, AVL Gas Analyser, AVL Smoke Meter, Carbon residue apparatus, flash point & fire point apparatus, cloud point & pour point apparatus, copper-strip corrosion apparatus, portable viscometer & density meter, precision electronic balance etc.
- **Renewable Energy Lab:** Table Top Hybrid energy laboratory set up, hybrid solar energy research test rig (New Energy Lab)- (Heliocentris Germany make), Dye Sensitized Solar Cell Experimental Kit, Laminar Flow Hood, Solar Thermal Training System, Solar Concentrator Training System.
- **Solar PVT Lab:** Thermal performance Solar Air Collector.
- **Solar RTC Lab:** Performance testing of solar thermal collectors.
- **Advance biodiesel Lab:** Equipped with Biodiesel reactor, Ultrasonicator, Magnetic stirrer with hot plate and energy regulator, Oxidation stability analyser.

Thrust Areas

1. Solar energy
2. Microfluidics
3. Bio heat transfer
4. Boiling heat transfer
5. Droplet dynamics

6. Computational Fluid Dynamics
7. Advanced Optimization Techniques
8. Biofuel research
9. Battery and Fuel cells
10. Wind Energy
11. Hybrid Renewable energy
12. Ocean Renewable Energy
13. Refrigeration and Air Conditioning
14. Exergoeconomics
15. Energy Storage

Placement detail

Majority of the students have opted for their higher study in some of the premier institutes across India and abroad. Few of them are also placed in leading industries.

Project and Publication details

There are presently six nos. of projects being handled by the faculty members from the thermal engineering and seven of them have been completed successfully, so far. These are funded by different Govt. agencies, for e.g., DST, SERB, CPRI, MNRE, etc.

Students and faculty members of the department have published more than 100 research papers and also a number of book chapters in reputed publishing house over the last few years.

For further information, contact

The Head

Department of Mechanical Engineering

National Institute of Technology Silchar

Assam-788010, India.

Email: hod@mech.nits.ac.in