



Five days hands-on workshop on Instrumentation and Data Analysis in Solar and Thermal Engineering Research

April 08 - 13, 2024



Department of Mechanical and Industrial Engineering



About MIT Manipal

Manipal Institute of Technology (MIT), Manipal was established in the year 1957 as one of the first pioneering self-financing engineering colleges in the country. In the year 2000, it became a constituent institute of the Deemed University - Manipal Academy of Higher Education (MAHE). With a total student intake of about 2500 per year, and around 10,000 students, over 650 faculties, over 1000 support staff, over 30,000 alumni, the Institute provides the right ambiance and platform for the students' all-round development. It has the requisite student to teacher ratio. MIT has 21 undergraduate programs, 30 Masters Programs and Doctoral programs in all streams of Engineering and Science under 18 different departments. The institute undertakes sponsored research programmes supported by funding agencies such as DST, CSIR, AICTE and the Ministry of Environmental Sciences. It has collaborative research programs in association with premier research laboratories and institutes in India and abroad.



About the Department:

Established in the year 1960, the Department of Mechanical and Industrial Engineering has become one of the most sought-after departments for admission at both UG and PG levels. The department offers two Under Graduate programs (Mechanical Engg. & Industrial Engg.), three Post Graduate programs (Thermal sciences & energy systems, Computer aided design & analysis, Manufacturing engineering) and also PhD programs. The department is recognized as a QIP center for post graduate and PhD programs. The department consists of experienced faculty members who are constantly engaged in undertaking research work of original nature and have subsequent publications in various reputed national and international journals and conferences. The department has very good industry - institute interaction and faculty members are involved in consultancy in addition to regular academic work. Recently all the programs offered by the department (both UG and PG) are accredited by Institution of Engineering & Technology (IET), UK.



About Renewable energy lab: To cater to the needs of M Tech (Thermal Sciences & Energy Systems) program, a Renewable Energy laboratory was established in the year 2014. Apart from meeting the curriculum requirements of the M Tech program, the lab has several high-end instruments and set ups to carry out advanced research in the areas of conventional thermal and solar thermal power systems. The salient feature of this lab is most of the research related set ups are being designed and fabricated in-house, which has led to publications in high impact factor journals. The prominent set ups and instruments available in the laboratory are as under:

About the workshop

Thermal instrumentation encompasses a range of devices and tools utilized for measuring, monitoring, and managing thermal energy parameters. Its significance extends to both industrial applications, such as process monitoring and control, and academic research, particularly in experimental investigations. Through experimental studies, researchers can establish cause-and-effect relationships between variables. By systematically altering conditions and observing outcomes, researchers can assess the validity of hypotheses and refine scientific theories. In this context, data processing assumes a critical role. Therefore, the workshop aims to equip participants with exposure and hands-on training in various research instrumentation techniques and data analysis. The program covers the theoretical foundations of solar and thermal instruments, their practical demonstration, and methods for data analysis.

Objective

Holistic approach to research in a thermal stream through experiments and data analyses.

Overview

Forenoon sessions - Lecture hall: Comprises lectures on fundamentals of instrumentation, potential applications, experimental techniques and data curation.

- Experiment planning
- Fundamentals of instrumentation
- Uncertainty analysis
- Process specific instruments
- Design of experiments
- Repeatability and similarity aspects
- Data acquisition systems
- Correlation development technique
- Boundary layer phenomenon in fluid flow
- Importance of calibration

Afternoon sessions - Renewable energy laboratory: Demonstration of various process instruments and control systems followed by hands-on training to get acquainted with their usage.

- Mass flow and volumetric flow meters and calibration
- Differential pressure transmitters and calibration
- Application of thermocouple laws and temperature sensors
- Solar simulator and solar radiation measurement
- AC/DC power analyzer and PV analyzer
- Thermocouple bead maker and Thermostatic bath
- Thermal imager and Variable frequency drive
- Hot wire anemometer
- Resistance heating elements
- Data logging facility

Concluding session - Comprises the following activities:

- Summary of the lectures and laboratory exercises
- Salient features and the take-home messages from the workshop
- Aptitude test

Outcome

Disseminating the importance of thermal instrumentation and experimental research to the stakeholders, listing down the scope for research and possible collaborative research.

Resource persons

The sessions will be conducted by in-house experts who specialize in the field of solar thermal engineering.

- Eligibility: Faculty/Working professionals/Research scholars/M Tech students
- Maximum number of participants: 30 (First come first serve basis)
- Registration fees: Rs 3000.00
- Last date: April 04, 2024
- Participants need to bear their travel and accommodation (if any) expenses.
- Attendees are encouraged to bring their laptops for a practical, hands-on experience.

QR code for payment



QR code for Registration:



Wind turbine training system

Data Logger

Power analyzer



Thermal energy storage system

Mass flow meter

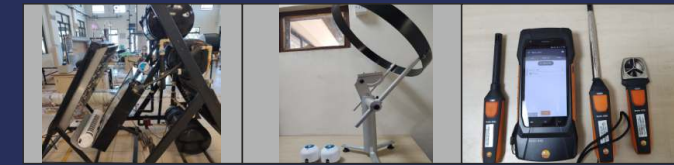
Ultrasonic flow meter



Two-axes parabolic concentrator

Differential pressure transmitter

Pressure calibrator



Solar water heater - Radiation simulator

Pyranometer

Hot wire anemometer



PV grid tied system

PV analyzer

Thermal imager



Fuel cell training system

Thermostatic bath

Thermocouple bead making machine

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