

Quality Improvement Program (QIP)
Sponsored One Week Online Short Term
Course

on

Thermal and Renewable Energy
Storage Techniques for Effective
Energy Management

from
October 25-29,2021



Organized by

The Department of Mechanical Engineering
National Institute of Technology
Arunachal Pradesh, India

About NIT Arunachal Pradesh

The National Institute of Technology, Arunachal Pradesh was established in the year 2010 by MHRD, Govt. of India and was inaugurated on 18th of August, 2010 as a member of a group of ten new NITs. These new NITs were established as centers of excellence in technical education to combat the growing need of technological professionals in India as well as in the world. It is one of the 31 National Institutes of Technology in India and is recognized as an Institute of National Importance. Presently the Institute is running in project phase with yearly intake of 190 undergraduate students in five major Engineering departments such as Civil Engineering, Computer Science and Engineering, Electrical Engineering, Electronics and Communication Engineering and Mechanical Engineering. Each department is equipped with well established state of the art laboratories to cater holistic development of the students. Despite of few geographical constraints, the Institute has thrived through rigorous challenges and has evolved to see the new heights with present capacity of 760 students pursuing various bachelor, master as well as doctorate degrees from the departments. The faculty and student of the Institute are also engaged in various R&D projects sponsored by various Government agencies and the current value of such running project is around 5 Crore for 25 projects. The Institute participated in the NIRF 2021 and ranked 160 in the Engineering category.

About the Department

The Department of Mechanical Engineering at NIT Arunachal Pradesh was established in August 2013. The department offers four-year B.Tech degree program in Mechanical Engineering with an annual intake of 40 students. The department started PG program (2 years M.Tech) in Mechanical System Design & Innovation Technology (MSDIT) from July 2016 and Fluids and Thermal Engineering from July 2019 with an intake of 25 students each and has also been actively involved in initiating research programmes in various multidisciplinary areas leading to Ph.D. since 2015-16. Moreover, the department emphasizes to excel in industry oriented research, testing and consultancy work, aiming service to the society and benefit for the student community.

About the Faculty Development Program

An intensive course on Thermal/Renewable Energy Storage for Effective Energy Management will be offered during October 25-29, 2021, under Quality Improvement Program, All India Council of Technical Education, New Delhi. The course is designed to cater the needs of teachers, scientists from R & D houses and Labs, and practicing engineers from industries. This program will be specifically useful for persons who are concerned with training / teaching, research, and industrial applications of thermal energy management, efficient storage and reuse of thermal energy, waste heat recovery, PCM thermal battery, modelling, to name a few. The primary objective of this course is to acquaint the participants with thermal energy storage; different storage techniques and selection criteria, PCM based thermal energy storage and waste heat recovery systems, thermal performance measures and performance enhancement techniques. The state-of-the-art computational modelling and simulation techniques will be discussed to develop a sound understandings of mechanisms governing the energy storage and recovery. At the end various thermal storage applications will be discussed along with guidelines for designing and developing a thermal battery system.

Course and the topics to be covered

To effectively deal with the issue of energy poverty, there is a need to establish low-cost energy management systems. Thermal energy storage based energy management system is one of the technologies that can help to mitigate the energy scarcity. It facilitates clean and efficient storage and reuse of thermal energy and acts as a thermal battery. The primary objective of this course is to acquaint the participants with thermal energy storage; different storage techniques and selection criteria, PCM based thermal energy storage and waste heat recovery systems, thermal performance measures and performance enhancement techniques. Apart from these, the following topics will be covered:

- Thermal battery: Context and genesis of thermal energy storage, Heat and cold energy storage, Different storage techniques: sensible, latent, thermochemical storage, Different materials and selection criteria, PCMs, organic and inorganic materials, salt hydrates, molten salts.
- PCM based thermal Storage for Solar and Building applications covering many examples of sensible and latent heat storage systems using organic, inorganic type of PCMs.
- Sustainable thermal energy storage for zero energy buildings with special emphasis on the sustainability aspects and significance of energy conservation in buildings.
- Characterization of Phase change materials and their compatibility with metals in heat exchangers with examples of corrosion in pipes, stability tests.
- Utilization of Phase change materials for solar thermal collectors in solar concentrating collectors for process heating and power generation applications.
- Application of Phase change material based Nano fluids in Thermal Power plant in condensate cooling of a thermal power plant by adding PCM for nanoparticles and used as a coolant.
- Recent advancements in building energy systems with a special emphasis on thermal energy storage systems of sensible and latent heat type

- Renewable energy driven heating and cooling systems.
- Modelling and simulation of PCM thermal battery systems, Performance enhancement techniques, Applications of PCM thermal battery.

Expected outcome

- Understand the importance of sensible and latent heat thermal energy storage systems in the world energy scenario and the need for efficient energy storage systems.
- Get familiar with unique characteristics of Phase change materials, availability, and cost criterion.
- Application of PCMs for Thermal comfort and building architecture i.e., in HVAC systems.
- Application of PCMs for renewable energy systems i.e., in solar water heaters, solar thermal power plants.
- Application of nanomaterial based PCMs for thermal power plants and heat transfer in exchangers, heat sinks, heat pipes.
- Awareness on the recent advancements happening in the field of thermal and renewable energy technologies across the world.
- Renewable energy driven heating and cooling systems.
- Modelling and simulation of PCM thermal battery systems, Performance enhancement techniques, Applications of PCM thermal battery.

Program Coordinators

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Organizing Committee

Dr. R. P. Sharma, Associate Professor, Dept. of Mechanical Engineering
 Dr. Manjula Das Ghatak, Assistant Professor, Dept. of Mechanical Engineering
 Dr. Anup Paul, Assistant Professor, Dept. of Mechanical Engineering
 Dr. Prases Kumar Mohanty, Assistant Professor, Dept. of Mechanical Engineering
 Dr. Shubhajit Das, Assistant Professor, Dept. of Mechanical Engineering

Tentative Schedule

Day	11 AM-01 PM	03 PM-05 PM
Day 1	Session 1	Session 2
Day 2	Session 3	Session 4
Day 3	Session 5	Session 6
Day 4	Session 7	Session 8
Day 5	Session 9	Session 10

Target Audiences

All faculties of Degree level Technical/Engineering College/Institutions/ Universities approved by the AICTE are eligible to attend the Short Term Course.

Important Dates

Last date for receiving application through mail: **22.10.2021 (Friday)**
 Intimation to the selected applicants: **23.10.2021**
 Short Term Course duration: **25.10.2021 to 29.10.2021**
 Note: Only selected participants would be informed by E-mail.

Registration Form

QIP Sponsored Short-Term Course on

THERMAL AND RENEWABLE ENERGY STORAGE TECHNIQUES FOR EFFECTIVE ENERGY MANAGEMENT

October 25-29, 2021

Name:

[Block Letters Provide as appearing on your Institute or Official ID]

Category [Academic/Industry]:

Details [Academic/Industry]:

Designation:

Institute/Industry Name:

If Institute, whether AICTE approved Institute [Yes/No]:

Gender:

Highest Academic Qualification:

Address for Correspondence:

Contact/WhatsApp Number:

E-mail ID:

Signature of the participant

Approval for participant

We approve the above applicant is a faculty/scholar/employee of our organization. He/She is recommended to attend for the QIP STC during 25th to 29th October 2021 at NIT Arunachal Pradesh through online mode

Date:

Signature with seal
[Head of the department/Organization]

****Send the scanned copy of the filled in registration form to dipaksen.me@gmail.com**