FIVE-DAY SKILL DEVELOPMENT WORKSHOP ON BATTERY THERMAL MANAGEMENT WITH HANDS-ON USING ANSYS FLUENT

During

17-21 April 2026

(Online Mode)

To be organized by

Department of Mechanical Engineering
National Institute of Technology
Rourkela-769008, Odisha

ELIGIBILITY

Participation in this workshop is open to faculty members, early career faculty members, post-doctoral fellows, research scholars, PG/UG students, researchers from the research laboratory, personnel from R&D sectors, Industrial personnel/engineers, and any other interested personnel. **This workshop serves as an ideal faculty development program (FDP) focused on battery thermal management.** The successful participants will be given a participation certificate.

COURSE FEE

- Personnel from Industry and R&D units: Rs. 1500/-
- Faculties/ Research Scholars/ Students/ Technical staff members of academic institutions/ researchers from research laboratories: Rs. 1000/-

PAYMENT & REGISTRATION PROCESS

Please transfer the course fee amount to the bank account mentioned below.

Account name: CONTINUING EDUCATION NIT ROURKELA
Account No.: 10138951784
Bank name: State Bank of India
Branch name: NIT Campus Rourkela
IFS Code: SBIN0002109
UPI ID: 01389517841@sbi
Merchant Name:
CONTINUING EDUCATION NIT RKL

Participants are required to fill out a Google form (https://forms.gle/rxGpEZrXYTTraFzF8) to complete the registration process and a copy of the payment receipt is to be attached to the Google form.

PLEASE NOTE

- Registration is mandatory. Only registered members will be allowed to attend the Workshop.
- An incomplete registration form (without proof/ online transaction details) will not be considered.
- The last date for registration is 16 April 2026.
- The registration fee is non-refundable.
- There is no registration fee for the participants from the host institute (NIT Rourkela).
- E-Certificate will be provided for the candidates attending all the sessions.
- Online joining link(s) through Google Meet/MS Team will be shared in due course.

PATRON

PROF. K. UMAMAHESHWAR RAO,
DIRECTOR, NIT ROURKELA

CO-PATRON

PROF. SWADESH KUMAR PRATIHAR,
DEAN (SRICCE), NIT ROURKELA

CHAIRMAN

PROF. SAROJ KUMAR PATEL
DEPT OF MECHANICAL ENGG.,
NIT ROURKELA.

COORDINATORS

DR. SUMAN GHOSH
DEPT OF MECHANICAL ENGG.,
NIT ROURKELA.

DR. JNANA RANJAN SENAPATI
DEPT OF MECHANICAL ENGG.,
NIT ROURKELA.

DR. SUSHIL KUMAR RATHORE
DEPT OF MECHANICAL ENGG.,
NIT ROURKELA

ADDRESS FOR CORRESPONDENCE

Dr. Suman Ghosh
Department of Mechanical Engineering
National Institute of Technology Rourkela
Pin-769008, Odisha (India)
Mobile: +91 9437809878, +91 7008326548
Email: ghoshs@nitrkl.ac.in
ghoshsuman20003@gmail.com

CONTACT NOS. & EMAILS

Dr. Suman Ghosh : +91 9437809878
ghoshs@nitrkl.ac.in

Dr. Jnana Ranjan Senapati : +91 9547147576
senapatijr@nitrkl.ac.in

Prof. S. K. Rathore : +91 9474828662
rathoresk@nitrkl.ac.in

NIT ROURKELA

NIT ROURKELA

ABOUT NIT ROURKELA

National Institute of Technology Rourkela is one of the country's premier national-level institutions for technical education. The erstwhile Regional Engineering College (REC) Rourkela was converted to a deemed university and renamed as National Institute of Technology Rourkela on 26 June 2002. It was declared as an Institute of national importance through the Parliament Act on 15 August 2007. During the last decade, the Institute has made a rapid stride in earning a reputation as a place of higher learning in engineering and technology. NIT Rourkela provides quality education in a diverse and multicultural environment. The mission of the Institute is to meet the needs of industry and commerce by providing human resources with the required knowledge and skills and also by promoting, disseminating, developing, and transferring technology. The Institute strives hard to become an internationally acclaimed institution of higher learning that will serve as a source of knowledge and expertise for society and be a preferred destination for undergraduate and postgraduate students along with advanced research. The vision of the Institute is to advance and spread knowledge in the area of science and technology, leading to the creation of wealth and welfare of humanity. The Institute offers undergraduate, postgraduate, and PhD programs in twenty-one branches of Engineering. The Institute's research centers are engaged in consultancy and research activities of several government bodies such as DST, DAE, CSIR, DRDO, BARC, ISRO, and private industries.

NIT ROURKELA RANKINGS

QS Asia University Ranking - 2026	
396 Asia University	99 Southren Asia University

QS World University Sustainability Ranking - 2026		
652 Overall Category	180 Asia Region	20 Country/Territory (India)

Times Higher Education Ranking - 2026	
601-800	World University Ranking

NIRF Ranking - 2025			
13 Engineering	07 Architecture	30 Research	34 Overall

NIRF Sustainable Development Goals Ranking - 2025	
09	Sustainable Development Goals

QS World University Ranking (by Subject) - 2025	
701-750 Computer Science Information Systems	501-600 Mathematics

Times World University Ranking - 2025	
601-800 World University Ranking (Engg.)	191 Asia University Ranking

Times Higher Education Impact Ranking - 2025	
401-600	Impact Ranking

ABOUT THE DEPARTMENT

The Mechanical Engineering Department of NIT Rourkela comprises three divisions, namely Design, Manufacturing, and Thermal Engineering. The department is known for research in a variety of fields, including fluid flow, heat transfer, mechanical vibration, robotics, CAD/CAM, precision engineering, metal forming, manufacturing, CFD, industrial refrigeration, and cryogenics. The department's academic programs reflect not only the core areas of Mechanical Engineering but also the research specialization of the faculties. At present, the department has over one hundred research scholars pursuing research in diverse fields. All the academic groups work in close cooperation while retaining individual identities. Many Research and Development projects being pursued by the faculty are sponsored by Government agencies and private industries. The major sponsors of these projects are BRNS, DST, ARDB, BRFST, and HBL Power Systems.

ABOUT THE COURSE

The said skill development workshop/program on battery thermal management systems (BTMS) focuses on the design, modelling, simulation, and optimization of cooling strategies for electric vehicles (EV) and high-performance batteries to improve efficiency and safety. The workshop aims to use CFD to manage the thermal behavior of Li-ion battery packs in automotive and energy storage systems. The course covers 3D geometry creation/modelling, mesh generation, CFD simulation, and heat transfer analysis using Ansys Fluent. Key topics include conjugate heat transfer, CFD simulation of air cooling, liquid cooling, spray cooling, mist cooling, PCM cooling, and thermal runaway mitigation for batteries in automotive and energy storage systems. The said specialized course is planned to emphasize simulating battery heat generation, cooling (using air/liquid/ mist/PCM) performance, temperature uniformity, and mitigating battery thermal runaway. This workshop is designed to train participants with practical skills for handling and solving real-world industry problems related to battery cooling, reliability, and performance. The workshop is highly effective and valuable for engineering roles in the EV industry, where maintaining optimal battery temperature is critical for performance and safety.

KEY COMPONENTS OF TRAINING

- **Fundamental Principles and Core Topics:** Understanding battery technology, Li-ion battery, heat generation, fundamentals of fluid dynamics/flow and heat transfer, heat removal/heat dissipation, battery thermal and cooling management (active and passive management).
- **Modeling Techniques and Simulation Steps:** Creating 3D models/geometries of battery cells and packs, including enclosures and cooling channels; Generating high-quality meshes for both solid (battery cells) and fluid (coolant) domains to ensure accurate heat transfer results; Setting up Fluent: defining boundary and operating conditions, enabling thermal modeling, and configuring solvers.
- **Simulation Scenarios:** Numerical analysis using Multi-Scale Multi-Domain (MSMD) and Conjugate Heat Transfer (CHT) methods to predict thermal behavior at different C-rate, especially during high-rate discharging; Simulating Air Cooling (varying air velocity), Liquid Cooling (using water/glycol or dielectric fluids), spray cooling, mist cooling, PCM cooling, and thermal runaway mitigation for batteries in automotive and energy storage systems.
- **Post-Processing:** Visualizing and analyzing temperature distributions, identifying hotspots, assessing thermal performance, and comparing the efficiency of different cooling strategies.
- **Optimization & Validation:** Optimizing coolant flow rates and verifying results against experimental data to ensure safety and efficiency; reducing hot spots, proposing innovative BCM systems, and predicting thermal runaway situations with temperature distribution.
- **Industry Application:** Focus on EV and high-performance battery packs with optimized cooling systems, emphasizing on improving life and reliability; Provides free lessons on 'Thermal Design and Management of Battery Packs'.

PARTICIPANTS CAN EXPECT TO LEARN HOW TO:

- Set up and run 3D simulations of battery packs.
- Analyze the effects of various cooling methods (air cooling, liquid cooling, spray cooling, mist cooling, PCM cooling) on battery temperature.
- Optimize thermal performance to ensure safety and longevity, and to mitigate thermal runaway.
- Utilize simulation tools to predict battery performance during discharge. .

NIT ROURKELA

NIT ROURKELA