सत्यमेव जयते
विज्ञान एवं प्रौद्योगिकी विभाग
DEPARTMENT OF
SCIENCE & TECHNOLOGY

ONE WEEK TRAINING PROGRAM ON

EMERGING TECHNOLOGIES IN CHEMICAL ENGINEERING: FROM THEORY, EXPERIMENTS TO INDUSTRY APPLICATIONS

22-28 AUGUST 2022

Organized by

Department of Chemical Engineering, National Institute of Technology Durgapur
Under 'SYNERGISTIC TRAINING PROGRAM UTILIZING THE SCIENTIFIC & TECHNOLOGICAL INFRASTRUCTURE (STUTI)'
An initiative of Department of Science and Technology (DST), Government of India.

About the Institute

The National Institute of Technology- Durgapur (formerly Regional Engineering College, Durgapur), was established by an Act of Parliament in 1960 as one of the eight such colleges aimed to function as a pace setter for engineering education in the country and to foster national integration. It is conferred as an Institute of National Importance under ministry of Education, Government of India. NIT Durgapur ranked sixth in all NITs. It is a fully-funded premier Technological Institution of the Government of India and is administered by an autonomous Board of Governors.

About the Department

The Department of Chemical Engineering of National Institute of Technology, Durgapur, was established with active support of UNESCO. The B.E. course in Chemical Engineering was started in 1964, and the Post-graduate programme was introduced in 1968, along with the doctoral programme in Chemical Engineering. The department has a sanctioned intake of 75 students for the B.Tech programme and 07 students for 5 years dual degree B. Tech Programme and 40 students M.Tech students per year.

Details of the Training Program

The Scheme 'Synergistic Training program Utilizing the Scientific and Technological Infrastructure' (STUTI) is intended to build human resource and knowledge capacity through open access S&T Infrastructure across the country. As a complement to the various schemes of DST funding for expansion of R&D Infrastructure at academic institutions, STUTI scheme envisions a hands-on training program and sensitization of the state-of-the-art equipment as well as towards sharing while ensuring transparent access of S&T facilities. This training content is designed considering the impact of blending theoretical and practical knowledge of the process widely used by the Chemical Engineering and Allied Sector. This training program will be very helpful to all branches of Science and Engineering.

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ACTIVITY	DELIVERABLES
THEORY AND CONCEPT BUILDING	
Emerging Energy Solutions in Chemical Engineering	This unit introduces the potential of two emerging energy solutions namely Battery technology and photo catalysis
Recent Advancement in Waste Valorization	This unit deals with the potential algae technology and waste lube oil technology in the area of waste valorization, biodegradable polymer
Frontier Technologies to Tackle Environmental Problems	This unit will enable to understand three frontier technologies namely Bio diesel technologies, Membrane technologies including its fabrication and characterization and carbon sequestering technology to deal with environmental problems. Green technology in petroleum industry
Process Simulation by Aspen Plus to Solve Real World Chemical Engineering Problems	This unit will give an overall idea about how to use Aspen simulation to solve various industrial problems of reactors, distillation columns, heat exchangers etc.
Computational Fluid Dynamics (CFD) Applications to Gain Insight	This unit deals with application of CFD to gain insights of process equipment
Application of Artificial Intelligence (AI) and metaheuristic optimization in chemical industries	This unit will enable to understand how AI, machine learning and metaheuristic optimization shaping the future of chemical industries by solving existing complex industrial problems and increasing their profit.
Principles of Analytical Instruments used in Chemical Engineering	This unit will provide an overall idea of underlying scientific principles of various high end analytic instruments used in laboratories and chemical industries.
HANDS ON PRACTICAL AND LABORATORY	
Aspen Simulation Computational Laboratory	Hands on training of Aspen simulations through Aspen plus simulators
CFD Laboratory	Demonstration of CFD applications in CFD software
Advance Analytical Instrumentation Laboratory	1. Determination of heavy metal from wastewater using Atomic absorption Spectrometer (DST-FIST support) 2. Determination of total organic and inorganic carbon using TOC analyzer 3. Estimation of anion from wastewater using ion chromatography 4. Detection/prediction of presence of functional group/s in a sample by UV spectroscopy and fluorescence spectroscopy (DST-FIST support) 5. Detection of components with quantification by HPLC (DST-FIST support) 6. Detection of components with quantification by GC-MS (DST-FIST support) 7. Thermal stability analysis of solid sample using TGA with inter-connected FTIR (DST-FIST support) 8. Cyclability Testing of a Sodium/Lithium-ion battery
Centre of Excellence in Advanced Materials	1. To investigate the morphology (e.g., particle sizes and shapes), metallographic details, imperfections, and topology of nanocrystalline powders and bulk materials by Field Emission Scanning Electron Microscope with EDX analyzer 2. To image the topography of soft biological materials in their native environments by Atomic Force Microscope 3. To image crystal structures, phase determination, and identify unfamiliar substances for use in crystallography by X-Ray Diffractometer 4. To provide a controllable indoor test facility of illumination approximating natural sunlight under laboratory conditions by Solar Simulator

Eligibility Criteria for Participants of Training Program

(a) Person of Indian origin;
(b) Minimum qualification should be Post Graduate (Science) or B. Tech. (Technology);
(c) Professors/Scientists/ Post-Doc Fellows/ Ph.D. Fellows/ Industry persons who are actively involved in research and development (R&D);
(d) Not more than 3 people from one institute per training should be allowed from outside the host institute.