

SUSTAINABLE COOLING TECHNOLOGIES

2nd July – 13th July 2018

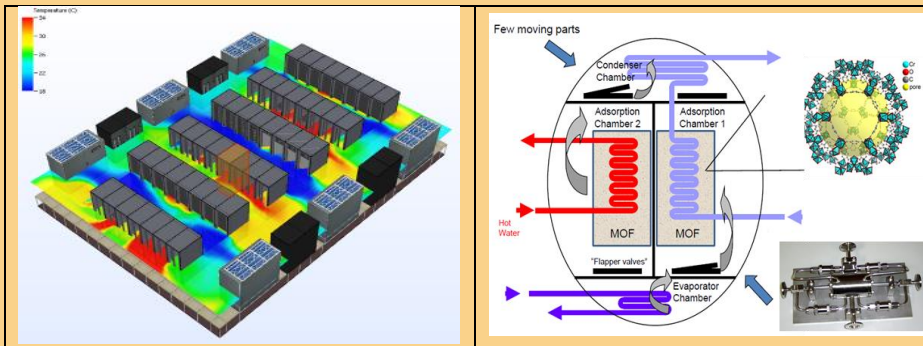
Course as approved under the MHRD Scheme on Global Initiative on Academic Network (GIAN)

Organized by

Department of Mechanical Engineering



National Institute of Technology Agartala



Course Objectives:

The lecture course addresses students of undergraduate and graduate level (B. Tech, M. Tech, PhD students), faculty working on cooling science and technology as well as professional working in refrigeration and air-conditioning industries.

Course Contents:

This course is organized in two modules that should be taken together.

Modules:

A: Fundamental aspects of thermally powered adsorption cooling science (2nd – 6th July 2018)

- ❖ Energy utilization trend and economic forecast.
- ❖ Introduction to various energy conversion systems including mechanical vapor compression, adsorption, absorption, cascaded energy utilization and hybrid cycles.
- ❖ Fundamental aspects of adsorption, introduction to adsorption isotherms and adsorption kinetics and discussion on a related technical paper.
- ❖ Isostatic heat of adsorption, pressure-temperature-concentration (P-T-X) diagrams with problem solving session.
- ❖ Design of adsorber / desorber heat exchanger, heat exchanger, design effect on the performance of adsorption cooling cycle.

B: Application aspects of adsorption science for cooling (9th – 13th July 2018)

- ❖ Derivation of minimum heat source temperature for thermally powered adsorption cooling cycles, minimum desorption temperature for all types of IUPAC adsorption isotherms, introduction of composite adsorbent materials for adsorption cooling systems, discussion on a related technical paper.
- ❖ Introduction of various absorption cycles, ideal adsorption cooling cycle and performance modeling of adsorption cooling systems plus discussion on a related technical paper.
- ❖ Application aspects: selection and classification of adsorbent materials, adsorber design, basic adsorption cooling cycles plus discussion on a related technical paper.
- ❖ Design and development of adsorption cooling, cooling-cum-desalination, cooling-cum-refrigeration cycles.

Who Should Attend: Executives Engineers & Researchers from Manufacturing and Government organizations including R & D laboratories. Students (from B.Tech/M.Sc./M.Tech/PhD) & Faculty from academic Technical Institutions. Professional working in refrigeration & air-conditioning industries.

Registration Fees:

Participants

From abroad: 400 US\$

Industry/ Research Organizations: Rs. 12,000

Academic Institutions for Faculty: Rs. 5,000 Students: Rs. 3,000

The above fee includes working lunch, all assignments, 24-hour free internet facility. Participants will be provided with shared double / single bedded accommodation in the Institute Guest House on payment basis.

N.B: Participants must register for the course on the following link before **June 10, 2018**.

<http://www.gian.iitkgp.ac.in/GREGN>

Application Procedure:

A onetime fee of 500/- (excluding the registration fee as mentioned above) may require to be paid while registering in the above GIAN web portal. Participants should further submit the Registration Fee (as mentioned above) through online transfer on **State Bank of India A/c No. 30358199684, Name of A/c. Registrar, NIT Agartala & IFSC Code- SBIN0011491** latest by **June 10, 2018** to the course coordinators.

Course Coordinator: Dr. Swapan Bhaumik

Co-Coordinator: Dr. Sudev Das

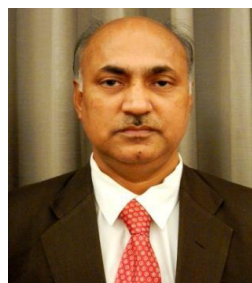
Faculty Members Conducting the Present Course:

Prof. Bidyut Baran Saha worked as an Associate Professor at the Interdisciplinary Graduate School of Engineering Sciences of Kyushu University until 2008. He worked as a Senior Research Fellow at the Mechanical Engineering Department of National University of Singapore prior joining the Mechanical Engineering Department of Kyushu University in 2010 as a full Professor. He joined the Kyushu University Program for Leading Graduate School, Green Asia Education Center in March 2013 as a Professor. Since January 2016, he has been working as a Professor and Principal Investigator at the International Institute for Carbon-Neutral Energy Research (WPI-I2CNER) in the Division of Thermal Science and Engineering. His research interests



include thermally powered adsorption systems, heat and mass transfer analysis, and energy efficiency assessment. He has published more than 400 articles in peer-reviewed journals and international conferences.

Dr. Swapan Bhaumik is an Associate Professor & Head ME Dept., National Institute of Technology Agartala, Tripura, India. He received his B.E. (CU), MME (JU) & PhD (IIT Roorkee) degree in the year 1987, 1991 & 2003 respectively. He is having 25 years teaching and two years Industry and R & D experience. He is a Life Member of ISHRAE, ISTE, ISME & ISTAM, Fellow of The Institution of Engineers (India), Member of ASME & SEEM. He is presently a Council Member,



The Institution of Engineers (India) from 2016 to 2020. He has research interests in the area of Cooling Technologies, Refrigeration and Air-Conditioning, phase change heat transfer and multiphase flow. He is the author of more than 30 journal and 20 conference papers.

Dr. Sudev Das is an Assistant Professor in Chemical Engineering Department, National Institute of Technology Agartala, India. Prior to that, he worked with several institutes and industries in India and abroad. He received his B.E (Chemical Engg.) degree from A.E.C, Guwahati University, M.Tech (Chemical Engg.) degree from USCT, GGSIPU Delhi and PhD degree in Engineering from NIT Agartala. He received the various prestigious fellowships namely Rajiv Gandhi National Fellowship and GATE Fellowship. His research interest in physical vapor deposition coating, micro/ Nanoscale heat transfer, boiling heat transfer and computational phase change heat transfer. He has author of 20 papers archival journals and conference proceedings.



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