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**Short Term Course on CRYOGENIC TECHNOLOGY: MATERIALS, PROCESSES & EQUIPMENT at IIT Kharagpur**

**Cryogenic Engineering Centre, Indian Institute of Technology Kharagpur**

**Announces**

A 5 day, short term course on **CRYOGENIC TECHNOLOGY: MATERIALS, PROCESSES & EQUIPMENT – 2014 (Open Course)**

**Date: February 17-21, 2014 (Monday – Friday)**

**INTRODUCTION & SCOPE OF THE COURSE:**

Cryogenic technology deals with production, maintenance and applications of low temperature, typically below -150°C. With the advancement of technology and growth of human knowledge, cryogenics is gaining more relevance in all spheres of social milieu. Today cryogenic technology is applied in medical, biological and food preservation processes as well as in futuristic technology like fusion reactors for power generation and deep space probe.

In view of the growing demand of cryogenics, both at national and global levels, this course is conducted to impart basic understandings on theories and practices of cryogenic engineering. Efforts will be made to address the broader spectrum of issues rather than discussing in depth on a particular topic. The participant will learn to use the fundamentals, equations and concepts in their particular applications of research, developmental activities and operations of cryogenic installations. **The course will be useful for faculty of engineering colleges, scientists of R&D organizations, engineers in industry and entrepreneurs in cryogenic business.**

**Course out line:**

1. Introduction to Cryogenic Engineering
2. Properties of Cryogenic Fluids
3. Basics of Thermal Engineering: Thermodynamics, heat transfer & fluid flow
4. Behavior of Materials at Low Temperature
5. Cryogenic Storage & Transport: Dewars, transfer lines, valves and cryostats
6. Vacuum Techniques
7. Cryogenic Safety
8. Production of Low Temperature: Cryogenic Liquefiers & Refrigerators
9. Cryocoolers: Thermodynamics and Applications
10. Cryogenic Separation Processes
11. Basics of Compressors, Expanders or Heat Exchangers Cryogenic Processes.
12. Cryogenic Instrumentation:

**Co-ordinators and Faculty:**

1. Dr. Parthasarathi Ghosh  
Assistant Professor, Cryogenic Engineering Centre, IIT, Kharagpur-721302
2. Dr. Kanchan Chowdhury  
Professor, Cryogenic Engineering Centre, IIT, Kharagpur-721302

Faculty from Cryogenic Engineering Centre may deliver lectures depending on their expertise.

**Eligibility of the Candidates**

Minimum requirement for educational qualification is any one of the following:

- i) **B. Tech in any branch of engineering**
- ii) **M. Sc in physics**

**Venue of Lectures:**

Visveswaraya Guest House Lecture Room  
Indian Institute of Technology, Kharagpur-721302

**Class Schedule:**

**Dates: February 17-21, 2014 (Monday – Friday)**

**Sponsors may please note:**

- a) Please inform the candidate that he/she should **bring a scientific calculator** to the classroom without fail.
- b) Please give a photocopy of this brochure to the prospective participant as soon as he/she is nominated by the organization and please tell them to contact the coordinator directly via e-mail.

**Timing:** Classes will begin at 9:00 a.m. sharp. There will be breaks for lunch and coffee. Classes will end at 6:00 p.m. **Total contact period is 40 hrs.**

**Registration:**

A fixed number of participants would be accommodated into this course on first-pay-first-serve basis.

For participants from within India, **the course fee is INR 28,150/- (Indian Rupees Twenty eight thousand one hundred and fifty only including service tax of 12.6%)**. For faculty of Engineering College and University, a discount of **Rs. 5000/-** would be applicable. The course fee may be sent as **demand draft on any bank at Kharagpur or at par cheque in favour of 'CEP-STC, IIT Kharagpur' in full.**

**For participants coming from outside India, course fee is US \$ 900.**

Bank transfer would also be accepted for all participants: both from within and outside India. Bank details: a) **Name of Beneficiary: Indian Institute of Technology, Kharagpur, PIN: 721302, West Bengal, India;** b) **Name of Bank: Syndicate Bank, IIT-SRIC Extension, Kharagpur-721302;** c) **Account Name: CEP-STC, IIT Kharagpur;** (d) **Account Number: 9556 220 000 2955;** e) **Bank**

**Swift Code: SYNBINBB 120.** All Bank charges are to be borne by the organization.

A scanned copy of the bank transfer document may be sent as proof of payment.

The course fee includes the following services:

- 1) Tea and snacks twice daily
- 2) Lunch
- 3) Lecture notes, handouts and Power Point Presentations

### **APPLICATION FORM**

**Indian Institute of Technology Kharagpur  
Kharagpur- 721302, (WB) INDIA**

**Short Term Course  
on  
Cryogenic Technology: Materials, Processes &  
Equipment**

**February 17-21, 2014 (Monday – Friday)**

**Please fill up the form online**

<https://docs.google.com/spreadsheet/viewform?formkey=dDNKa3p5cUo4MXdHM2NsV0doekpLdIE6MQ#gid=0>

Surname .....

First Name.....Title .....

Department (Abbreviation if applicable) .....

Job Title .....

Function .....

Company.....

P.O. Box or Street .....

Postal Code, City, Country .....

Highest Academic Qualification.....

Phone .....

Fax .....

E-Mail.....

Bank Transfer Details .....

Accommodation Type .....

Food Habit (Veg/Non-Veg) .....

**The following additional information may be provided for all participants holding foreign passports:**

Name .....

Fathers Name.....

Nationality.....

Date of Birth .....

Place of Birth .....

Number .....

Date and Place of Issue of Passport .....

Current Residential Address .....

Permanent Residential Address .....

Profession .....

Place of Employment .....

Academic Credentials. Please use for separate pages for each participant .....

### **Accommodation:**

**Appropriate number of rooms will be reserved at the New Technology Guest House. Single occupancy in a double-bedded room (AC) (Rs. 800/person per day), Double occupancy in a double bedded room (AC) (Rs. 600 / person per day) and Suites (AC, with a big bed in one room**

**and sofa set and fridge in another) (Rs. 1,689 / room per day including service charges)** are available. All rooms have TV and internet facility. Please specify the type of room to be booked. Charges for the boarding and lodging should be paid by the participants directly to the Guest House.

### **General information:**

IIT is located about 6 km from the Kharagpur Railway Station. Kharagpur, 116 km from Calcutta, is conveniently connected to Howrah (Kolkata) by many local trains every hour and also by express trains. Kharagpur has direct rail links to most major cities in India. Those travelling by air may hire a taxi from Calcutta Airport, which would bring you to IIT Campus at Kharagpur (145 km one way) within 2.5 hours. The minimum charge is about Rs. 2,500/-. Rickshaws (Rs. 70/-), Autorickshaws (Rs. 100/-) and Taxis (Rs. 150/-) are available to come from Kharagpur Railway Station to IIT Campus. Weather at Kharagpur would be pleasant in March. **Please contact Arjun Saha of J K Travels (+91 9434193014, +91 9932573310) for travel related help.** You may request him to send a vehicle to Kolkata Airport to pick you up.

### **Address for communication:**

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Assistant Professor, Cryogenic engineering  
Centre**

**IIT, Kharagpur-721302**

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partha\_s2000@yahoo.com**

**Mobile: +91 9932584162**

**Tel: +91 3222 283594**

**Fax: +91 03222 282258 / 255303**

**REGISTRATION CLOSES ON: DECEMBER 31st, 2013. If the number of registered participants before this date is not sufficient, the course may be withdrawn.**