

- Category-1:** Nil (for TEQIP Institutions)
- Category-2:** ₹ 500 (for IIT Kharagpur Students)
- Category-3:** ₹ 25000* (For Industry/Self Sponsored)

Payment should be made via demand draft drawn in favour of "CEP-STC, IIT Kharagpur", payable at Kharagpur

DEMAND DRAFT DETAILS	
Amount ₹	
Bank Name	
Place	
Branch Code	
DD No. & Date	

Declaration

The information provided is true to the best of my knowledge. If selected, I agree to abide by the rules and regulations of the course and shall attend the course for the entire duration without any failure.

Place _____

Date _____

Signature of applicant _____

Please complete the details above and mail alongwith registration fee to:

Prof. Susanta Banerjee
Materials Science Centre
IIT Kharagpur – 721302
E-mail: susanta@matsc.iitkgp.ernet.in

About IIT Kharagpur

History

First in the chain of IITs to be set up by the Government of India, Indian Institute of Technology, Kharagpur started in 1951 in the erstwhile Hijli Detention Camp. It has now blossomed into one of the finest technical institutions in the world, with 585 faculty members in 19 Departments, 9 Centres, and 12 Schools offering 6 M.Sc. programmes, 5 Joint M.Sc. -Ph.D. programmes, 15 B.Tech (Hons.) programmes, 49 joint M.Tech. - Ph.D programmes, 2 M.Tech. programmes (in video-conferencing mode), 1 Master of City Planning programme, 1 Master of Medical Science and Technology programme, 1 LL.B. in Intellectual Property Rights programme, 34 Dual-Degree (both B.Tech and M.Tech) programmes, and 2 Management programmes. It also has MS, Ph.D, and D.Sc. programmes.

Location

Kharagpur is known world over for two landmarks. One, the longest railway platform, and the other, the Indian Institute of Technology, more commonly known as IIT. Situated about 120 km west of Kolkata, Kharagpur can be reached in about 2 hours by train from Howrah railway station of Kolkata or 3 hours by car from Kolkata Airport. Kharagpur is also connected by direct train services to most major cities of the country. The Institute is about 10 minutes drive (5 km) from the Kharagpur railway station. Private taxi, auto-rickshaw or cycle-rickshaw can be hired to reach the Institute.

Weather

Winter (October to February) is moderate and pleasant (10 to 25°C) in Kharagpur. Summer (March to June) is hot (25 to 40°C) and sometimes humid. Rains are normally confined to the months of June to September.

POLYMERIC MEMBRANES: FUTURE MATERIALS FOR GAS SEPARATION AND FUEL CELL APPLICATION (PEM)

Overview

Polymeric materials find application in diversified application owing to their ease of preparation, manipulation of the structures by synthetic manipulation, light weight, corrosion resistance and ease of moldability and fabrication of articles of different shape and sizes, and of relatively low cost. Membranes or films made out of polymers find applications different separation technologies and have recently emerged as an important category of separation processes compare to many other conventional separation processes. Polymeric membranes can be used to satisfy many of the separation requirements, which are, in the separation of molecular and particulate mixtures, in the controlled release of active agents, in membrane reactors and artificial organs, and in energy storage (batteries) and conversion (fuel cells) systems. Membrane technologies are classified to several applications, such as microfiltration (MF), ultrafiltration (UF), nanofiltration (NF), reverse osmosis (RO), pervaporation (PV), gas separation (GS) and proton exchange membrane fuel cell (PEMFC). Membrane separation technologies refer to any separation processes in which membranes function as both a barrier and a sieve for separating feed species such as liquid mixtures, gas mixtures, and colloidal particle mixtures. Some of the important advantages of using polymeric membranes include high efficiency, low energy consumption, versatile applicability, economics etc.

In this course a comprehensive understanding will be provided on different types of membrane forming polymers and their applications in three major fields; i) Gas separation, ii) Pervaporation (separation of liquids); iii) Proton exchange membranes for fuel cell application. The course will start with a brief introduction to different polymeric materials and in depth discussion will be provided in the consecutive sections on different synthetic strategies to manipulate the polymer structure for better separation efficiency and membrane performance.

Important Dates

Last date for receiving application : June 30, 2015
Intimation to the applicants : July 15, 2015
Course duration : November 27 – 29, 2015

Objective of the Course

- Exposing participants to the fundamentals of polymeric materials, polymer structure, preparation, membrane fabrication, and polymeric membrane based technologies and their advantages in terms of energy efficiency and simplicity.
- Provide a thorough understanding on polymeric membranes for different separation applications, manipulation of polymer structure for better separation efficiency and economic aspect.
- Make aware on polymeric proton exchange membranes (PEM) for fuel cell application, synthetic strategies for high proton conductivity and stability.

Venue

IIT Kharagpur and its extension centers at Bhubaneswar and Kolkata through online video lecture. All video-conferencing enabled classrooms at Kharagpur, Kolkata and Bhubaneswar are equipped with high definition video-conferencing system. Each of these acoustic treated air-conditioned video enabled classrooms with multiple HD cameras, document viewers and large display monitors permit teachers to conduct LIVE interactive sessions from Kharagpur with multiple remote classrooms at Kolkata and Bhubaneswar. 8 Mbps leased line connectivity of Kolkata and Bhubaneswar centers with Kharagpur ensure uninterrupted bi-directional lossless audio video transmission.

Course Schedule and Methods

5.00 – 7.00 PM on Friday
 9.00 – 11.00 AM and 3.00 – 5.00 PM on Saturday
 9.00 – 11.00 AM and 3.00 – 5.00 PM on Sunday



susanta@matsc.iitkgp.ernet.in

Course Contents

- 1 Introduction to polymeric materials as potential candidate for membrane based separation
- 2 Membrane based separation, concepts, membrane fabrication and types
- 3 Concepts and designing polymeric membranes for separation of gases
- 4 Concepts and designing polymeric membranes for pervaporation application
- 5 Concepts and designing polymeric membranes for fuel cell application.

The Faculty



Dr. Susanta Banerjee has more than 25 years Research and teaching experience in Govt. and Private R & D organization and in academia. At present he is Professor and Head of the Materials Science Centre, IIT Kharagpur. He is a Fellow of the West Bengal Academy of Science & Technology. He is recipient of Alexander Von Humbolt Fellowship, INSA-DFG

Fellowship, DRDO Technology Spin-Off award and GE Management award. His research interest includes development of new polymers for low-k applications, membrane materials for gas and liquid separation, proton exchange membrane materials for fuel cells and photovoltaic applications. His research work has resolved many of the key issues in membrane based separation and he has successfully demonstrated new polymers that showed both high permeability and selectivity. His work has given a new direction in developing high proton conductive membranes for fuel cell application. He has published **145 research papers** in peer reviewed journals and presented more than 100 papers in scientific conferences. He is the inventor of seven **patents**, author of six book chapters and one book "Handbook of Specialty Fluorinated Polymers" (ISBN: 9780323357920) published by Elsevier. He is well known for grooming post graduate students.

Eligibility

Category -1 (AICTE Sponsored / TEQIP Sponsored):

Faculty from AICTE approved Colleges / Institutions / Universities.

Category – 2 (Student / Industry / others):

B.E. / B.Tech. / AMIE / Diploma in Engineering / B.Sc. / M.Sc. or any higher qualification in relevant field. Persons from Industries & Govt. Organizations related in this field are also eligible.

Course Fees

Category-1: Nil (for TEQIP Institutions)

Category-2: ₹ 500 (for IIT Kharagpur Students)

Category-3: ₹ 25000 (For Industry/Self Sponsored)

To confirm participation please send the scanned copy of the Demand Draft to susanta@matsc.iitkgp.ernet.in by 30th June, 2015 positively.

Accommodation

Outstation participants will be provided accommodation at IIT Kharagpur on self payment basis as per availability on prior request.

Course Co-Ordinator

Prof. Susanta Banerjee

Principal Coordinator
Materials Science Centre
IIT Kharagpur

Kharagpur – 721302, West Bengal, INDIA

Phone: +91-3222-282274 (Head's Chamber),

283972 (Chamber), 283973 (R)

+91-9434745062 (M)

Email: susanta@matsc.iitkgp.ernet.in

REGISTRATION FORM

KNOWLEDGE DISSEMINATION PROGRAMME

POLYMERIC MEMBRANES; FUTURE MATERIALS FOR GAS SEPARATION AND FUEL CELL APPLICATION (PEM)

November 27 - 29, 2015

Name

Date of Birth

Gender Male Female

Category Academic Student Professional
(Please enclose a bonafide certificate from your parent institution)

Organization

Address for Correspondence

Preferred location for attending

Phone

E-mail

Highest Academic Qualification

Experience (in years)

Accommodation Required (at IIT Kharagpur) Yes No

