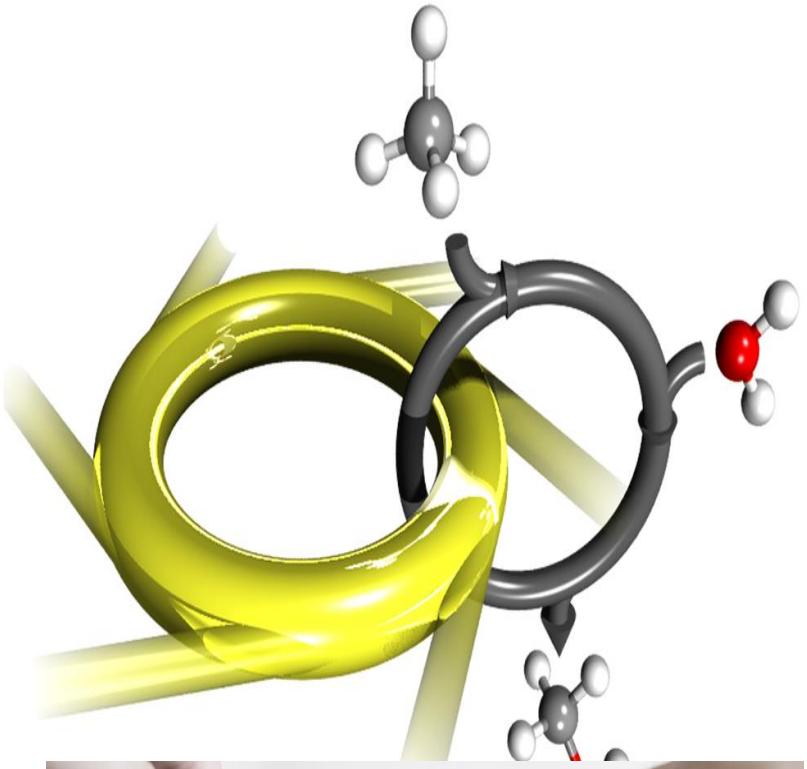
One Week Short Term Course on



April 5- 9, 2020

FUNCTIONAL MATERIAL AND HETEROGENEOUS CATALYSIS

Dhanbad-826004, Jharkhand, India

Indian Institute of Technology (Indian School of Mines), Dhanbad
Department of Chemistry

Professor Emiel Hensen is a Full Professor and Dean of Chemical Engineering and Chemistry in **Eindhoven University of Technology Netherlands.** He has published more than 502 journal articles, several book chapters and patents. The research of Hensen focuses on the fundamental and applied aspects of catalyzed reactions relevant to clean and sustainable processes for the production of fuels and chemicals with the aim to identify active sites and understand reaction mechanism. The working approach is to apply advanced in-situ) characterization methods, (on as realistic as possible model systems combined with theoretical modeling (DFT, microkinetics) and performance testing (kinetics, high-throughput methods, transient techniques) to guide the design and synthesis of nanoscopically organized and chemically functionalized catalytic solid materials. The materials explored include primarily highly structured microporous and mesoporous materials containing reactive centers such as protons, metal ions and metal, metal oxide and metal sulfides clusters. Applications are directed towards the improvement of current industrial chemical processes and novel processes based on renewable feedstock such as biomass. Catalytic target reactions are methane activation, Fischer-Tropsch catalysis, environmental catalysis, zeolite catalysis, conversion of biogenic molecules such as sugars and lignin, metal-support cooperativity in selective oxidation, CO2 reduction and photocatalysis

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Goverment Of India

GIAN
GLOBAL INITIATIVE OF ACADEMIC NETWORKS

INDIAN INSTITUTE OF TECHNOLOGY (INDIAN SCHOOL OF MINES) DHANBAD
भारतीय प्रौद्योगिकी संस्थान (भारतीय खनि विद्यापीठ) धनबाद
1926
उत्तिष्ठत जाग्रत प्राप्य वरान्निबोधत

Host Faculty and Coordinator of the course.

Professor. **Biswajit Chowdhury** working as a Full Professor in Department of Chemistry; Indian Institute of Technology (ISM), Dhanbad. Prof Chowdhury did his doctoral research in Indian Institute of Chemical Technology (IICT), Hyderabad. Then he carried out post doctoral research in Kochi University **JAPAN** National Advanced Institute of Science and Technology (AIST-Tsukuba) JAPAN. His research area focused on chemistry of gold nanoparticles, Oxide materials, versatile heterogeneous catalytic reactions such as biomass conversion, CO2 fixation, epoxidation, C-H activation etc. He has published more than 65 papers, book chapters, Indian and Japanese patents. He delivered several invited lecture in different countries. He handled several national and international
projects.

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Tentative topics of the Course

- **Day 1 (05.04.2020)**

  Lecture 1. *(3.00 p.m to 4.00 p.m)*
  Topic: *Fundamentals of heterogeneous Catalysis 1 hrs (**EH**)*

  Lecture 2. *(4.30 p.m to 5.30 p.m) 1 hrs*
  Topic: *Basic concepts in heterogeneous catalysis – catalytic cycle, Sabatier principle (**EH**)*

  Lecture 3 (6.00 p.m to 8.00 p.m) 1 hrs (***EH***)
  Topic: *Elementary reaction steps, binding of atoms and molecules, periodic trends, Bronsted Evans Polanyi*

- **Day 2 (06.04.2020)**

  Lecture 4. (10.00 a.m to 11.00 a.m) 1 hrs
  Topic: *Structure sensitivity in metal catalysis with applications in methane steam reforming* ***(EH)***

  Lecture 5 (11.30 a,m to 1.30 p.m) 2 hrs
  Topic: Recent development in the Fischer-Tropsch reaction

  Lecture 6 (2.30 p.m to 3.30 p.m) 1 hours
  Topic: Acid-base catalysis by zeolites

  Lecture 7 (4.00 p.m to 5.00 p.m) 1 hours
  ***Topic*:** Theory of acid-base catalysis and applications in hydrocarbon activation

  Tutorial 5.00 p.m to 5.45 p.m BC

- **Day 3 (07.04.2020)**

  Lecture -8 (8.30 a.m -10.30 a.m)
  Topic: Hydrocracking and methanol conversion processes 2hrs (***EH)***

  Tutorial: 2.00 p.m to 3.00 p.m (BC)

- **Day 4 (08.04.2020)**

***Lecture 9 (*10.00 a.m to 12.00 p.m) 2 hrs**
Topic: *Mass transfer limitation in liquid and gas phase reactions (**BC**)*

Lecture 10 (2.30 pm to 4.30 pm) 2hrs
*Topic: Advanced Characterization techniques (SAXS, SANS,) (**BC**)*

: 30

- **Day 5 (09.04.2020)**

Examination (11.00 am to 1pm) 2hrs BC
Certificate Distribution (2.30 pm to 4.30 pm)

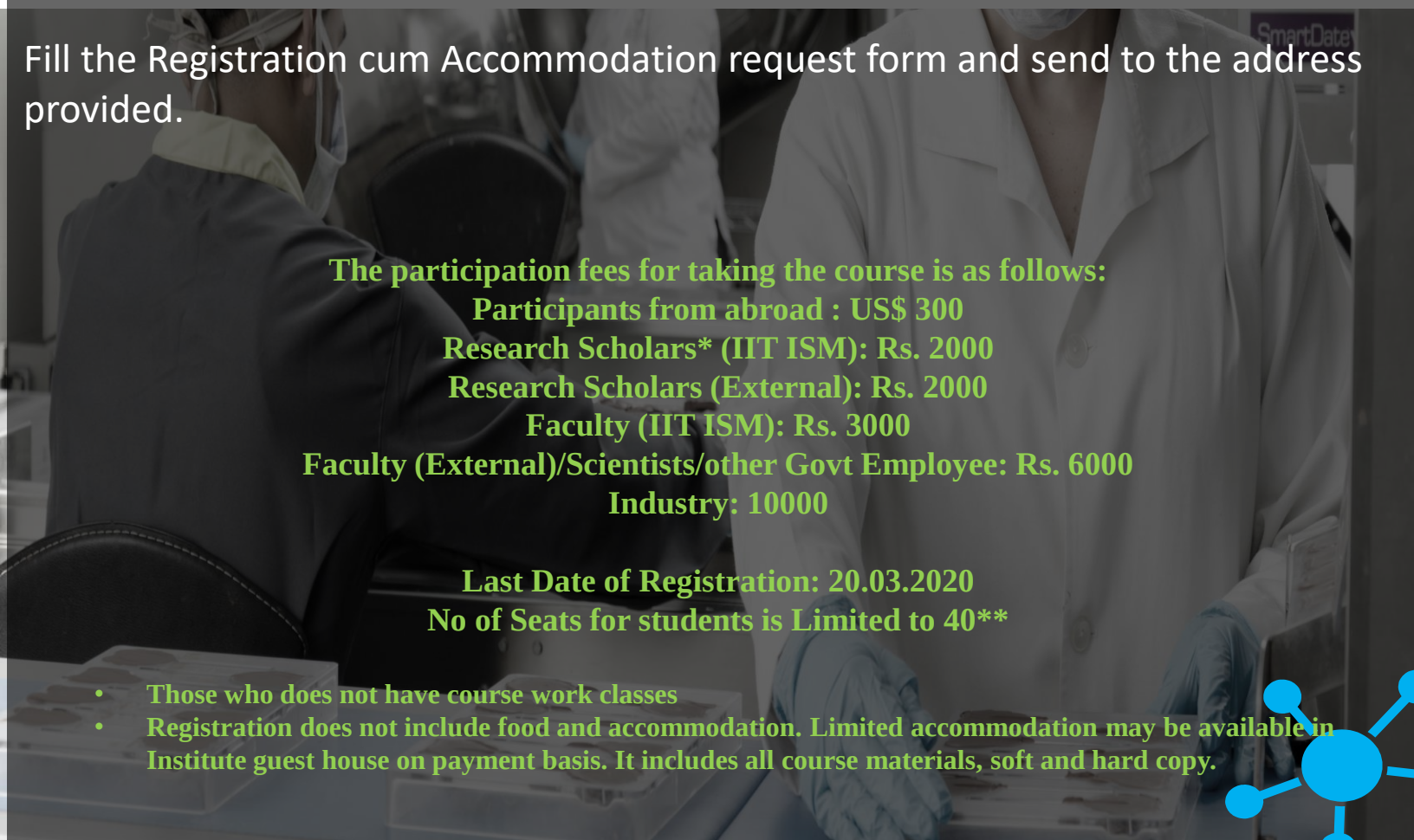
Stage-1: WEB Registraon:

Please visit :

http://www.gian.iitkgp.ac.in/GREGN/index and create login User ID and Password. Fill up blank registration form and do web registration by paying Rs.500/- on line through Net Banking/Debit/Credit Card. Those who have already been paid, need not pay again. Registration to the portal is one me affair and will be valid for life time of GIAN. Once registered in the portal, an applicant will be able to apply for any number of GIAN courses as and when necessary.

Stage-2: COURSE Registration:

Fill the Registration cum Accommodation request form and send to the address provided.



The participation fees for taking the course is as follows:
Participants from abroad : US$ 300
Research Scholars* (IIT ISM): Rs. 2000
Research Scholars (External): Rs. 2000
Faculty (IIT ISM): Rs. 3000
Faculty (External)/Scientists/other Govt Employee: Rs. 6000
Industry: 10000

Last Date of Registration: 20.03.2020
No of Seats for students is Limited to 40**

- **Those who does not have course work classes**
- **Registration does not include food and accommodation. Limited accommodation may be available in Institute guest house on payment basis. It includes all course materials, soft and hard copy.**

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April 5- 9, 2020 @ IIT (ISM) Dhanbad

Course Registration Form

Name (Capital Letters): .....Gender (M/F) :.....
Qualification:.....Designation:.....
Category (Faculty/Scientist/Engineer/Officer/Industry Executive/Scholar/Student): .....
Organization: .....
Mailing Address with PIN Code: .....
.....
Contact Details : Off :..... Res : .....
Mobile : ..... Email: .....
Payment : .....DD No. : ..... Date : .....

DD in favour of **"Registrar, Indian Institute of Technology (ISM), Dhanbad"** payable at CANARA BANK, Saraidhela Branch, Dhanbad. (IFSC:CNRB0000986). **SB Account No: 0986101009746 OR NEFT/RTGS** (Please furnish the full details if NEFT/RTGS like Name of Account Holder, UTR No./Transaction ID, Name of Bank and Branch, Date and Amount of payment).

Place : Date : (Signature of Applicant)

Prof. Biswajit Chowdhury, Dept. of Chemistry, Science Block, IIT(ISM), Dhanbad, Jharkhand-826004
e -mail scanned copy of filled form to: biswajit72@iitism.ac.in

Last Date of Registration: 20.03.2020