Finishing School (Technical) Training Program – Student Outreach

on

‘ADVANCEMENT IN CHEMICAL REACTION ENGINEERING AND CATALYSIS’

26th June to 6th July, 2019
(**Total Duration: 30 hrs**)

Convener
Dr. Femina J. Patel

Coordinators
Prof. S. R. Patel
Prof. U. P. Christian

Organized by
Chemical Engineering Department
Vishwakarma Government Engineering College,
Chandkheda, Ahmedabad.

Finishing School (Technical) Training Program

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'ADVANCEMENT IN CHEMICAL REACTION ENGINEERING AND CATALYSIS'

26th June to 7th July, 2019 (Durations: 30 hrs)

Coordinators
Prof. Sunil R. Patel
Prof. Ujayla P. Christian

Organized by
Chemical Engineering Department
Vishwakarma Government Engineering College
Chandkheda, Ahmedabad

About the Institute

Vishwakarma Government Engineering College, Ahmedabad was established in August 1994, with an objective of imparting higher education in various fields of Engineering and Technology. This Institute is recognized by All India Council of Technical Education (AICTE), New Delhi and Institute of Engineers (India). The college is administrated by Directorate of Technical Education, Gujarat State, Gandhinagar and is affiliated with Gujarat Technological University. VGEC shifted to its own campus at Chandkheda, Ahmedabad in the year 2005.

About Chemical Engineering Department

Chemical Engineering Department offers B.E. and M.E. programmes with specialization in Chemical Engineering. The Department is having state of art laboratory facilities like Gas Chromatography (GC), High Pressure Reactor, Super critical fluid extraction, Alpha-FTIR Spectrometer, UV- Spectrophotometer etc.

Objectives of the Program

Catalysis and Reaction Engineering lies at the heart of many chemical processes from the academic research lab through living systems to the industrial large-scale reactor. By understanding and careful use of catalysis many processes can be made faster, cleaner and more sustainable. Catalysis has been proved to be a key parameter for successful process development of many technologies. Catalysis can help us to improve the performance of the process in terms of better conversion and selectivity for desired products. To make aware the students about the latest development in the field of catalysis and reaction engineering.

Course Contents of the Program

- Heterogeneous Catalysis
- Advancement in Chemical Reaction Engineering and Catalysis
- Ionic Liquids as Catalyst
- Fast Reaction Analytical Techniques
- Application of Catalysis
- Design of Reactor
- Electro Catalysis

For Whom

The programme will provide excellent opportunities to U.G. Final Year Students/P.G. Students

Program Schedule

Total Duration: 30 hrs

Resource Persons

During the course, lectures will be delivered by eminent experts from Ahmedabad University, Nirma University, S. P. University, SAL Institute of Technology and Chemical Engineering department of VGEC.

How to apply

There is no registration fee. Registration form is available through following link

https://docs.google.com/forms/d/e/1FAIpQLSes7saX55HXp_a_uGicn_JNidJD0HYBnMgi5K_s495GOJb0Rw/viewform?usp=sf_link

Convener

Dr. Femina J Patel
Head, Chemical Engineering Department,
Vishwakarma Government Engineering College (VGEC),
Nr. Visat Three Roads, Sabarmati-Koba Highway,
Chandkheda, Ahmedabad-382424.
Gujarat, India
Ph: 079 29099903
Email: hod_chem@vgecg.ac.in

Training Schedule

26th June to 6th July, 2019 (**Total Duration: 30 hrs**)

Time→ Date (Day) ↓	**8:30 a.m. to 10:30 a.m.**	**10:30 a.m. to 12:30 p.m.**	**12:30 p.m. to 1:00 p.m.**	**1:00 p.m. to 3:00 p.m.**	**3:00 p.m. to 3:15 p.m.**	**3:15 p.m. to 5:15 p.m.**
26/06/2019 (Wednesday)	"Advancement in Chemical Reactor Design", Prof. S. B. Thakor, Asso. Prof. Chemical Engg., VGEC	–		–		–
27/06/2019 (Thursday)	"Heterogeneous Catalysis" Dr. F. J. Patel, Professor and Head, Chemical Engg., VGEC	–		–		–
28/06/2019 (Friday)		"Fluidization Engineering", Prof. M. G. Nayak, Asst. Prof. Chemical Engg., VGEC		"Electro Catalysis" Dr. Bhavna Soni Professor Chemical Engg., Sal Institute of Technology, Ahmedabad		"Ionic Liquids as Catalyst", Dr. D. V. Rabari, Asst. Prof. Ahmedabad University
29/06/2019 (Saturday)		"Advancement in Chemical Reaction Engineering and Catalysis" Dr. R. K. Mewada, Professor and Head, Chemical Engg., L. E. College, Morbi	Lunch Break	Nanocatalysis", Dr. P. N. Dave, Professor, Chemistry, S. P. University	Tea Break	"Design of Reactor", Prof. S. B. Thakore, Asso. Prof. Chemical Engg., VGEC
05/07/2019 (Friday)		"Reaction/Reactor Network Engineering", Prof. Z. Z. Painter, Asst. Prof. Chemical Engg., VGEC		"Fast Reaction Analytical Techniques", Dr. K. R. Gurjar, Asst. Prof. Chemistry, VGEC		"Bioethanol Valorization via Gas Phase Catalytic Oxidation", Prof. S. R. Patel and Prof. U. P. Christian, Asst. Prof. Chemical Engg., VGEC
06/07/2019 (Saturday)	"Application of Catalysis" Prof. S. S. Patel, Professor, Chemical Engg., Nirma University	Industrial Visit		Industrial Visit		Students Examination and Assessment (03/08/2019)

COURSE DETAILS (30 hours)

Sl. No	Course Detail	No. of Hours
1	**Advancement in Chemical Reactor Design** Introduction, Rate law, Stoichiometry, Mass-Balance, Design equation. Reactor lining, heating & cooling arrangements, Moving Bed Reactor, Kinetics of Moving Bed Reactor, Performance equation, Example. Trickle Bed Reactor Design, Flow Regimes, Liquid Hold up, Pressure Drop. Bubble Column Reactor Performance equation, Flow Regimes, factors affecting the performance of BCR.	**04**
2	**Heterogeneous Catalysis** Introduction, Theory and Application of Heterogeneous Catalysis, catalysts and catalytic properties, general mechanism of action catalyst, Heterogeneous catalysis Area of application: reactions and catalytic processes , catalytic converter, general mechanisms: diffusion, adsorption - desorption kinetics	**02**
3	**Fluidization Engineering** Fluidization phenomenon, Liquid-like behavior of a fluidized bed, Industrial Applications, Dense beds, Bubbling fluidized beds, Entrainment from fluidized beds, High velocity fluidization, Solids mixing, segregation, and staging, Gas dispersion andinterchange in bubbling beds, Heat and mass transfer, Industrial applications.	**02**
4	**Electro Catalysis** Introduction, Electro Catalysis in Chemical Engineering, Process Design stage considerations, Minimizing waste & byproduct generation, Novel Reactor Technology, Application of Electro Catalysis and Processes.	**02**
5	**Ionic Liquids as Catalyst** Introduction to ionic liquids as catalyst, conversions and selectivities, application rhodium-catalyzed hydrogenation, isomerization, or hydroformylation of alkenes in the presence of Ionic Liquids as Catalyst.	**02**
6	**Advancement in Chemical Reaction Engineering and Catalysis** Role of catalyst components and other constituents, Deactivation of Catalyst: Physical deactivation, surface diffusion. Sintering mechanism and kinetics, chemical deactivation-types and kinetics, regeneration of catalyst. Selectivity and Stability.	**02**
7	**Nanocatalysis** Introduction to Nanocatalysis, Catalytic activity (bulk and nanoscale), catalytic activity determination for metal/metal oxide nanostructures. Langmuir-Hinshelwood mechanism for nanocatalyst, Mass transport, diffusion controlled process, catalytic efficiency and turnover frequency, inhibition. Application of metal nanoparticles in organic reactions (Heck and Suzuki-Maurya reactions), environmental remediation.	**02**
8	**Reaction/Reactor Network Engineering** Types of Reaction, Maximizing the Desired Products in Parallel Reactions for One Reactant and Two Reactants, Maximizing the Desired Products in Series Reactions.	**02**

9	**Fast Reaction Analytical Techniques** Advance analytical equipments, Application of advance analysis like Gas chromatography–mass spectrometry (GCMS), Liquid chromatography (LC), Scanning Electron Microscope (SEM), Atomic force microscopy (AFM), Small Angle X-Rays Scattering (SAXS), X-ray powder diffraction (XRD) etc. in industry and research.	**02**
10	**Bioethanol Valorization via Gas Phase Catalytic Oxidation** Introduction to bioethanol valorization, performance of noble metals over different supports, the effect of time on stream for the stability of catalyst at the reaction condition, effects various affecting parameters like temperature, pressure, O_2/ethanol molar ratio etc.	**02**
11	**Application of Catalysis** Introduction to catalyst, classification of catalyst, application of catalysis in fixed bed reactors, moving bed reactors, fluidized bed reactor, design of combination of catalytic reactor and regenerator, heat & mass transfer effects, new development in catalysis, straight through transport reactor.	**02**
12	**INDUSTRIAL VISIT** Detailed process description of the chemical industry with all chemical reactions explained by industry personnel. Latest advancement in the form of all R&D initiatives, quality improvement, yield improvement will be explained. Special emphasis on effluent treatment unit will be given.	**04**
13	**STUDENT EXAMINATION AND ASSESSMENT**	**02**
	TOTAL	**30**

List of Participants

Enrollment No.	Name	Enrollment No.	Name
160170105002	BHALODIYA MEET	160170105030	NIDHI PARMAR
160170105005	BHIMANI PIYUSH PRAVINBHAI	160170105031	PALA KRUNAL NAVINBHAI
160170105006	CHAUDHARI VISHVAMKUMAR SHAILESHBHAI	160170105034	PATEL HARSH
160170105008	CHAVDA VIJAYSINH	160170105035	PATEL ISHAN
160170105009	CHOVATIYA NAYANKUMAR SHANTILAL	160170105040	PATEL PARTHKUMAR BHUPENDRABHAI
160170105010	CHUDASAMA MILAN SURESHBHAI	160170105043	PRANAMI CHINTAN PAMABHAI
160170105011	DAMOR DARSHAN	160170105046	RANA PRANAVKUMAR MAHESHBHAI
160170105014	DHAMELIYA ABHISHEK HARESHBHAI	160170105048	SAVUKIYA ANKIT
160170105015	GAGIYA VISHAL	160170105050	SINGH PRABHAT
160170105016	GANDHI SHREY SUJITKUMAR	160170105051	SOLANKI JAY NARESHBHAI
160170105017	GANDHI YASHKUMAR	160170105055	VAGHANI AMITKUMAR DHANSUKHBHAI
160170105021	JADEJA VISHVAJITSINH	160170105056	VASAVA NIKUNJKUMAR NAGINBHAI
160170105022	JAGODARA KEVIN	160170105057	VIRAMGAMA RAVINDRABHAI HARAJIVANBHAI
160170105023	KAKADIYA BHARGAV RAJUBHAI	160170105058	VYAS PARTH MEHULKUMAR
160170105024	KEWLANI HITESH	160170105060	ASHU ABEY SAMUEL
160170105025	LAKHANI HARSH	160170105061	UDARA VINURADEWA NANDASENA
160170105026	MALANI BHARGAV BHUPATBHAI	170173105002	BARAIYA POOJA JIVANBHAI
160170105027	MEDA SANJAY SHRIKANNA	170173105006	MISTRY RAJAN RAMESHBHAI
160170105028	MUKUL LALWANI	170173105007	NAKUM MAHESH PARSOTAMBHAI
160170105029	NAKUM VIPULKUMAR DAYALAL	170173105014	SADHU PULKIT KUMAR GHANSHYAM PRASAD

Total = 40 students

PHOTOGRAPHS

Lecture session by Prof. (Dr.) Femina Patel, H.O.D. Chemical Engg. Department.

PHOTOGRAPHS

Lecture session by Prof. (Dr.) R. K. Mewada,H. O. D. Chemical Engg. Department, L. E. College of Engineering, Morbi

Lecture session by Prof. (Dr.)B. D. Soni,H. O. D. Chemical Engg. Department, SAL College of Engineering & Technology, Ahmedabad

Lecture session by Prof. (Dr.) S. S. Patel, Chemical Engg. Department, Institute of Technology, Nirma University, Ahmedabad

Lecture session by Prof. (Dr.) P. N. Dave, Department of Chemistry, Faculty of Science, S. P. University, V. V. Nagar.

PHOTOGRAPHS

Lecture session by Prof. (Dr.) D. V. Rabari,

Lecture session by Prof. M. G. Nayak

Lecture session by Prof. U.P. Christian

Industrial Visit to Harsh Organics Ltd.Vatva

Students Examination and Evaluation on 3rd August, 2019.