UPL UNIVERSITY OF SUSTAINABLE TECHNOLOGY

ISSUE - 12

CHEMEZINE

Chemical Engineering e-Magazine

Creating Competent Chemical Engineers for the world of tomorrow

DEPARTMENT OF CHEMICAL ENGINEERING, SRICT

To achieve excellence in Chemical Engineering and allied fields by providing excellent teaching learning experience enabling students to become competent professionals to tackle global issues.

MISSION

- To provide excellent technical education to students with basics of chemical engineering.
- To provide theoretical and practical education so that students vigorously apply knowledge in solving chemical engineering problems for sustained development.
- To inculcate professional ethics among students by exposing them to state of the art technologies in the field.
- To inspire students for lifelong learning and to develop leadership qualities in their career.

Program Educational Outcomes (PEOs) of Department

- To impart the fundamentals of chemical engineering and enable them to have a successful career in wide range of core industries.
- To deliver quality technical education thereby developing sustainable technology in addressing global issues.
- To prepare graduates who are capable of solving complex chemical engineering problems.
- To provide practical aspects of chemical engineering to the students by ways of industrial visits, expert lectures and increased industry-institute interaction thereby making students industry ready.
- To prepare graduates who can effectively communicate, demonstrate leadership qualities with creative thinking and professional ethics.

Message from Head of Department

It's our pleasure to share the latest highlights from our vibrant and dynamic Chemical Engineering Department in this bi-yearly newsletter. Over the past six months, we've been bustling with a multitude of enriching activities, fostering both academic growth and practical exposure for our students.

In line with our commitment to bridging academia with industry, our department facilitated several enriching industrial visits and guest lectures. These experiences have provided our students with a firsthand understanding of real-world applications, complementing their theoretical knowledge and igniting their passion for innovation. These exposures to the industrial world have offered invaluable perspectives, inspiring our budding engineers to delve deeper into the intricacies of chemical engineering and its evolving landscape.

Moreover, the activities under the IIChE Students' Chapter have been nothing short of remarkable. From organizing seminars to conducting workshops and collaborative projects, our students have showcased exceptional dedication and talent. These initiatives not only enhance their skill sets but also contribute significantly to the broader chemical engineering community. As we continue to nurture a culture of excellence and exploration within our department, I extend my heartfelt appreciation to our management, supporting industries, IIChE – Ankleshwar Regional Centre, faculty, students, and all our valued stakeholders for their unwavering commitment and enthusiasm. Together, we are shaping future leaders and innovators in the realm of chemical engineering.

Our chemical engineering fraternity is growing in terms of quantity and quality with *over 700 students* (Diploma, B.E., M.E., Ph.D., and Post Graduate Diploma), all making progress, and working in their specific domains. All students pursued industrial (in-plant) training and got immense experience. Strong academia and industry collaboration is possible due to the involvement of our industrial supporters. Looking ahead, we are excited about the upcoming opportunities, more effective MoUs, and collaborations with valued organizations, that will further enrich our academic journey.

Dr. Krunal J. Suthar

INDUSTRIAL VISITS

Batch	Course	Sem	Date	Name of Industry	Place
2020	BE	III	25.8.2023	Apex Pharma Chem	Ankleshwar
			13.09.2023	Guru Ashish Pharma	Panoli
			27.09.2023	Sterlite Organics	Panoli
2021	BE	V	03.07.2023	Godrej Ltd.	Valia
			21.09.2023	FMC Cheminova	Panoli

INDUSTRIAL VISITS

Batch	Course	Sem	Date	Name of Industry	Place
2022	BE	VII	05.09.2023	GNFC	Bharuch
			21.10.2023	Analpa Industries	Ankleshwar
			21.10.2023	Prime consultants and Engineers	Ankleshwar

Batch	Course	Sem	Date	Name of Industry	Place
2022	Diploma	III	22.08.2023	Jayshree Aromatics	Ankleshwar
			25.10.2023	Uma Organics	Ankleshwar
2021	Diploma	V	07.07.2023	Amul	Anand

EXPERT LECTURES

Sr. No	Semester	Expert Name, designation and organization	Topic
1	B.E. VII	Mr Hemendra Sata, (Dy. General Manager HR/Admin & Security), Godrej Ltd. Valia	Engineering Principles
2	B.E. VII	Mr. Rohit Gupta (Deputy Manager, SRF Ltd. Ankleshwar)	Industrial Safety
3	B.E. VII	Mr. Sudeep Mathur (External Consultant, Mckinsey)	Root Cause Analysis
4	B.E. VII	Dr. Swapnil Adsul (Executive-R&D, Apcotex Industries Ltd.)	Opportunities for Chemical Engineers in Industries
5	B.E. VII	Mr. Bhavik Mahant (PhD student, IIT Madras)	Applications of Nanotechnology in industries
6	B.E. V	Ms. Surabhi Nair, Safety Officer, Godrej Ltd. Valia	Industrial Safety
7	B.E. V	Mr Bhavik Mahant, IIT Madras	Absorption/Scrubber design
8	B.E. V	Dr. Yash Chawla, Poland	Creativity for Problem Solving
9	B.E. V	Mr. Snehal Tralsawala, Consultant	Safety (Process)
10	B.E. III	Mr. Mrunal, (Trainer, Acumen GATE Academy)	Career Guidance

EXPERT LECTURES

Sr. No	Semester	Expert Name, designation and organization	Topic
11	B.E. III	Mr. Nilesh More (Trainer, Acumen GATE Academy)	Career Guidance
12	B.E. III	Mr. Santosh Telange (AGM, Process Engieering & Design in Project Division, Coromandal International	Industrial applications of pumps and pipes
13	B.E. III	Mr. Bhavik Mahant (PhD student, IIT Madras)	Current and future scope of Chemical Engineering
14	D.E. V	Mr. Gokul Delvadiya, Assistant Executive Manager, Godrej Ltd, Valia.	Process Safety Management
15	D.E. V	Mr. Fenil Modi, Process Engineering Assosciate, UPL-12	Process Instrumentation
16	D.E. V	Mr. Meet Shah, Senior Executive, Deccan Fine Chemical Ltd.	Scope and Excitement of Chemical Engineering
17	D.E. V	Mr. Santosh Telange (AGM, Process Engieering & Design in Project Division) (Coromandal International Limited)	Industrial applications of pumps and pipes
18	D.E. V	Mr. Bhavik Mahant (PhD student, IIT Madras)	Project and process engineer
19	D.E.III	Mr. Sanjog Vishwas Deore, GEXCON Ltd	Safety in Industries
20	D.E. III	Mr. Kirat Nikhil Raval, Production Manager, Covestro India Private Limited	Introduction to Chemical Plant

PEER LEARNING INITIATIVE

Under Peer learning initiative (PLI), senior student delivers technical content to peers making it comfortable and easy for students. It also improves communications skills, and professional development.

Name of student	Sem	Course Name	PLI Delivered in	
NISARG MODI	BE-VII	PEM	BE	V
PATEL DIPALI K.	BE-V	PHT-II	DE	V
PATEL MONIKA	BE-VII	PR	DE	V
PATHAN VAJIDKHAN V	DE-V	MO,CET,CS	DE	III
PATIL KALPESH	BE-VII	IS,SHM	DE	V
PAWAN GUPTA	BE-VII	PDC,FFO,CRE-1	BE	V
PRITEE DIGHE	DE-V	IS,CS,FFO	DE	III
DEVARSH PANDIT	BE-VII	CPT-1	DE	III
KAUSHIK VAIJAPURKAR	ME-1	CRE	BE	V

Continue

PEER LEARNING INITIATIVE

Name of student	Sem	Course Name	PLI Delivered in	
RENUKA RAVI NASANE	ME-III	PA	DE	III
ROHAN KUMAR SURTI	BE-V	IS,MEBC	DE,BE	III
SAKSHI DIGHE	DE-V	CPT-I,CET	DE	III
SHIFAN PATHAN	BE-VII	F&C,FFO	BE	V,III
VIDHIT GANDHI	BE-V	MO,PEM,IPC,	BE,DE	III
VINAYAK SONAWANE	BE-V	MO	BE	III
VISHWAM PATEL	BE-VII	F&C	BE	III
NIRMAL PATEL	ME-III	PDC, NT	BE	V, VII
DHRUV PATEL	ME-III	NT	BE	VII
UTSAV PATEL	BE-VII	CAPS	BE	VII
DEV PRAJAPAATI	BE-VII	CS	DE	III
DEEP MODI	BE-VII	Petroleum Engg.	DE	V
AAKASH MANDAL	BE-III	Maths-1, BME	BE	I
RONIT SHAH	DE-III	Maths-1	DE	I

One to One (counselling) Sessions with students

Meeting of Diploma Semester-5 students with Mr. Ashok Panjwani, President, UPL University

Meeting of B.E. Semester-7 students with Dr. Shrikant Wagh, Provost, UPL University

Meeting of B.E. Semester-3 students with Dr. Omprakash Mahadwad, Dean – Engineering & CoE, UPL University

Meeting of B.E. Semester-3 students with Dr. Alok Gautam, Dean – R&D, UPL University

A flagship activity of conducting one-to-one meetings with students serve as a platform for personalized support, guidance, and improvement strategies tailored to individual student needs, contributing to the enhancement of overall performance within the academic environment.

UNIVERSITY EXAM RESULTS D.E., B.E., M.E. Semester-II, IV, VI Summer-2023

Sr. No	Semester	Total	Pass	Fail	% Pass
1	D.E. 2 Semester	113	43	70	38.05
2	D.E. 4 Semester	65	40	25	61.54
3	B.E. 2 Semester	38	25	13	65.79
4	B.E. 4 Semester	107	86	21	80.37
5	B.E. 6 Semester	77	75	02	97.40
6	M.E. 2 Semester	7	5	2	71.43

Top 3 from class

Diploma (D.E.) – Chemical Engineering Sem-2 Summer 2023			
Sr. No.	Enrolment No.	Name of Students	SPI
1	220101101101	VANZA YASH CHETANKUMAR	9.9
2	220101101102	VARSADA SHIV SURESHBHAI	9.81
3	220101101008	CHAUHAN LEESA JAGDISHBHAI	9.71

Toppers of D.E.- Chemical Engineering Sem-4 Summer-2023 Exam			
Sr. No.	Enrolment No.	Name of Students	SPI
1	210101101004	Dighe Pritee Suryakant	10
2	210101101014	Kapadia Axit D	10
3	210101101042	Patel Rajkumar Manojkumar	10
4	210101101049	Pathan Vajidkhan Villayatkhan	10

UNIVERSITY EXAM RESULTS B.E. and M.E Semester- 2, 4, 6 Summer-2023

CHEMICAL ENGINEERING BRANCH

B.E.- Chemical Engineering Sem-2 Summer-2023 (TOP 03 SPI)			
Sr. No.	Enrolment No.	Name of Students	SPI
1	220102101031	PRAJAPATI KEYA AMITKUMAR	9.91
2	220102101016	MANDAL AAKASHKUMAR RAVI SHANKAR	9.83
3	220102101035	RANA HARSHILSINH UPENDRASINH	9.83

B.E.- Chemical Engineering Sem-4 Summer-2023 (TOP 03 SPI)			
Sr. No.	Enrolment No.	Name of Students	SPI
1	210102101032	PATEL DIPALI KETANKUMAR	9.88
2	210102101055	SURTI ROHAN DHARMESHKUMAR	9.75
3	220102301006	GANDHI VIDHIT JIGNESHKUMAR	9.75

B.E.- Chemical Engineering Sem-6 Summer-2023 (TOP 03 SPI)			
Sr. No.	Enrolment No.	Name of Students	SPI
1	200990105014	MODI NISARG AMINESH	9.87
2	200990105018	CHANDEGRA MEET MOHAN	9.7
3	200990105027	LAKDAWALA OM SANJAYKUMAR	9.7
4	200990105028	SAINI UMESH KUMAR SITARAM	9.7

M.E.- Chemical Engineering Sem-2 Summer-2023 (TOP 03 SPI)			
Sr. No.	Enrolment No.	Name of Students	SPI
1	220103101005	PATEL NIRMAL SURESHBHAI	10
2	220103101004	PATEL DHRUV ANILBHAI	9.44
3	220103101003	NASANE RENUKA RAVI	8.56

100% PLACEMENT OF STUDENTS (BATCH 2019-23)

STUDENT NAME	PLACED INDUSTRY
BISWARI HARSH	UPL
BORRA RAVIKANTH	MIL
CHAUHAN DARSHAN	GFL
DUA PRATHAM	UPL
GANDHI KHUSH	MIL
GEHLOT KANISHK	UPL
GHEEWALA ARPITKUMAR	MIL
GOHIL ANURAGSINH	Piramal Pharma
GORASIYA VARUNBHAI	MIL
PRATHAM GOYAL	UPL
HAJARIWALA KRISIL	UPL
HIRPARA KEVIN	GFL
JADAV JAYDATTSINH	ZCL
MONIKA JADIYA	UPL
KASUNDRA KRUSHAL	NOCIL
LAD PRIYANK	UPL
MALAVIYA VIVEK	NOCIL
MEHTA KHUSHIBEN	Reliance
VISHWAS MISHRA	NOCIL
MODI BRONIT	Deccan
MODI KISHAN	Deccan
SIDDH MODI	MIL
NARIELWALA ADITYA	Deccan
PANCHAL VIRAJKUMAR	UPL
PANELIYA RAJ	UPL
PAREKH CHINTAN	UPL
PARMAR DIGVIJAY	NOCIL
PARMAR NIKUNJ	GFL
PARMAR PINTU	Deccan
PARMAR RAJVEERSINH	UPL
PARMAR VIRALKUMAR	UPL

STUDENT NAME	PLACED INDUSTRY
PATEL ABHAY	NOCIL
PATEL ARYAMAN	GFL
PATEL DAIVIK	UPL
PATEL DHARABEN	UPL
PATEL DHRUVKUMAR	Ion Exchange
PATEL HARSHKUMAR	Deccan
PATEL KINJALBEN	UPL
PATEL KRUNAL	Reliance
PATEL OM	UPL
PATEL PARTH	GFL
PATEL RAHULKUMAR	UPL
PATEL VATSALKUMAR	NOCIL
PATEL YASH	UPL
RANOLIYA VIRAT	Reliance
RATHOD NIRAV	Mahamaya lifesci.
SHAH DEEP YOGESH	UPL
SHAH SMITKUMAR	UPL
SHAIKH MASUD BILAL	NOCIL
HARSHRAJSINH SOLANKI	Piramal Pharma
PRIT THORIYA	MIL
RUSHIL VAGHASIYA	MIL
VAIJAPURKAR KAUSHIK	UPL
VYAS OM	Deccan
YADAV BHARGAVSINH	UPL
PRAJAPATI MEET	MIL
MANSURI MO. FAIZ	MIL
RANA JAY	GFL
MODI RONAK	Ion Exchange
DHRUVPALSINH CHAUHAN	GFL
RANA JAIMIN	Zcl
VAIBHAV CHAMPANERI	GFL
KARAN BARAD	GFL

ONGOING PLACEMENT STATUS OF STUDENTS
(Semester-VII - BATCH 2020-24)

SMIT PATEL	RAJVIRSINH KOSAMIA	OMPRAKASH PANDEY	YUVRAJSINH JADAV	DEWANSH MISHRA	NISARG MODI	MEET CHANDEGRA	BHATT MEET

Placed with UPL OpenAg™

Congratulation to our final year students

RECENTLY SIGNED MoUs

Signing of MOU between UPL University & Lanxess Ltd

Signing of MOU between UPL University & Bhumistha Infra

Signing of MOU between UPL University & Raks Pharma

ACTIVITIES

77th Independence Day Celebration

Chemical Engineering Department in collaboration with MSH Department celebrated 77th Independence Day of India. The flag hoisting was done at the worthy hands of the Chief guest: Rtn. Ghanshyam Gajera (President - Rotary Club of Ankleshwar). The occasion was also graced by Rtn. Manisha Arora - President Inner Wheel Club, Members from Rotary club, President of UPL University, delegates from industries, University office bearers, faculty, staff members and students.

अभ्युदय-2023

Convocation of B.E. Students (Batch 2019-23)

Chemical Engineering Department in collaboration with Electrical Engineering Department coordinated Abhyuday 2023. The program was held in the august presence of Mr. Rajesh Patil, Head-GACL - Dahej Complex as chief guest, Mrs. Sandra Shroff, Chairman, Ankleshwar Rotary Education Society (ARES), Mr. Ashok Panjwani, Vice-Chairman, ARES and the distinguished members from management committee. 194 B.E. students were felicitated with prestigious provisional degrees, certificate of academic excellence, cash prizes.

Eleven postgraduate (M.E.) students were awarded with prestigious degree during University's first convocation ceremony, which was a magnificent occasion. The event was graced by the esteemed presence of Dr. Aniruddha Pandit, Vice Chancellor of the Institute of Chemical Technology (ICT) Mumbai and our University management, trust members and all valued stakeholders

EVENTS

Eco-Friendly Ganesha Competition

IIChE students chapter organized an eco-friendly Ganesha Idol making competition for Students on 11th September 2023. Over 26 students participated in the event and made Idols with using Mud/Clay and paper material.

One day workshop on Microsoft excel for Semester-VII students

The Department of Chemical Engineering proudly organized a one- day workshop on Microsoft Excel exclusively for our final year students. This workshop was uniquely conducted by fellow students under the auspices of the IIChE Student Chapter, IQAC, and RAC. The workshop was conducted on 4th September 2023 and 72 students actively participated in the workshop.

EVENTS

Teacher's Day Celebration - PLI day

The Department of Chemical Engineering celebrated "Teacher's Day" by organizing the Peer Learning Initiative (PLI) sessions during the first two slots on 05th September 2023. 13 students from higher semesters participated and delivered well-prepared sessions to their peers.







EVENTS

Seminar on Career opportunities after diploma chemical engineering

The Department of Chemical Engineering had organized a seminar on "Career opportunities after diploma chemical engineering" in collaboration with Alumni association, IICHE, RAC and IQAC on 14th Sept 2023 at Seminar hall-1 from 2:00 PM. Eminent alumni of SRICT were invited to guide diploma sem-5 chemical engineering students.

Alumni details:

- **Shivam Patel**,
Team leader process, UPL-5
- **Kashyap Bhatt**,
Senior Executive, PI Industries
- **Vineet Mangroliya,**
Entrepreneur
- **Harshal Modi,**
Executive-Operations, OPAL
- **Amar Aghera,**
Asst manager, SaiRam Chemicals

Seminar on 'Introduction to Chemical Engineering Principles

Half day Seminar on 'Introduction to Chemical Engineering Principles' was organized under the banner of IIChE Students chapter for B.E. Semester-3 students. The Session delivered by: Dr. Rakesh Sinha, Asst. Professor, UPL University.

EVENTS

Workshop on "Microsoft Excel" for Faculty and Staff Members

The Chemical Engineering Department organized a one-day Workshop on "Microsoft Excel" in collaboration with RAC, IQAC and various Students Chapter (IIChE, ISHRAE, IEI, CSI) on 07th October 2023. Total 32 faculty and staff members participated in the workshop. Dr. Alok Gautam, Mr. Dhananjay Chauhan and Dr. Krunal Suthar delivered the sessions on basics, graphs and trendline and data analysis, respectively.




One day Workshop on CHEMCAD Simulator

The Department of Chemical Engineering in collaboration with RAC, IQAC and IIChE students' Chapter SRICT, organized one day training program for two batches of 5th semester Chemical Engineering students on 25th and 28th August 2023. Total 50 students participated in the workshop. The hands-on session were conducted on Role of Thermodynamic Models in Process Simulation, Simulation of Pumps, Compressors and Heat Exchangers in well-equipped computer laboratory of the department.




Versatility of Chemical Engineers & their future growth: Key tools

- Dr. Swapna Rekha Panda,
Associate Professor, UPL University

It's currently a debatable topic that, present and future chemical engineers will need to navigate the interface between the natural world and the data that describe it, as well as the usage of tools that turn data into useful information, knowledge, and understanding. This short article discusses a few of the tools and capabilities that will be required in the field of chemical engineering in near future. The key areas are data science and computational tools, modelling and simulation, novel instruments, and sensors and artificial intelligence (AI) application.

Data Science and computational tools: Chemical engineering has been a data-intensive field from the very beginning and is undergoing a transformation driven process largely by the way data can be acquired, created, shared, and utilized. Many labour-intensive measurements traditionally performed by humans are now routinely automated, making it easier than ever to acquire data in the laboratory. Open-source databases are now commonplace in such areas as biology, thermo physical properties, materials properties, and climate, water management, and agriculture. Natural language processing tools are improving at a rapid pace, and chemical engineers will need to develop skills to exploit new possibilities as they emerge. The growing ubiquity of data, along with increasingly powerful computers, networks, and algorithms, is creating opportunities for integration of data from disparate sources on scales that was left un-imagined before.

Modelling and simulation tools: Modelling and simulation tools are now commonplace in such areas as biology, thermo physical properties, materials properties, and climate, water management, and agriculture. Chemical engineers will have enormous opportunities to reimagining and redesign these systems to exploit the new ubiquity of and instantaneous access to data to achieve unprecedented robustness.

Novel instruments and sensors. Novel instruments and sensors are also important for chemical engineers to combine technical and sociological data to achieve advances that could not have been anticipated just a few years ago. The COVID-19 pandemic has revealed the fragility of worldwide supply chains, arising from their inherent interconnectedness and the "just-in-time" operating philosophy of many businesses.

AI boom a virtual solution: AI is one of the modern tools of data science that is rapidly transforming all fields of science and engineering, including chemical engineering. AI is a general term used to describe "machines" (fashioned primarily by models and algorithms) designed to mimic human intelligence. Chemical engineering researchers have been among the first to integrate AI into their toolset, and now into the discipline's curriculum. Deep learning is the most rapidly growing use of AI by chemical engineers, with deep neural networks (DNNs) being used to perform tasks or discover hidden correlations in datasets far too large to be handled any other way. The rapid adoption of AI by chemical engineering researchers is reflected in the steep rise in the number and frequency of American Institute of Chemical Engineers (AIChE) fall meeting presentation titles and abstracts containing AI-related terms. AI has many potential future roles in chemical engineering, with two areas in which the impact of AI in chemical engineering is expected to be profound: education, research, industry application like in manufacturing and materials discovery and design for biological applications.

Cont..

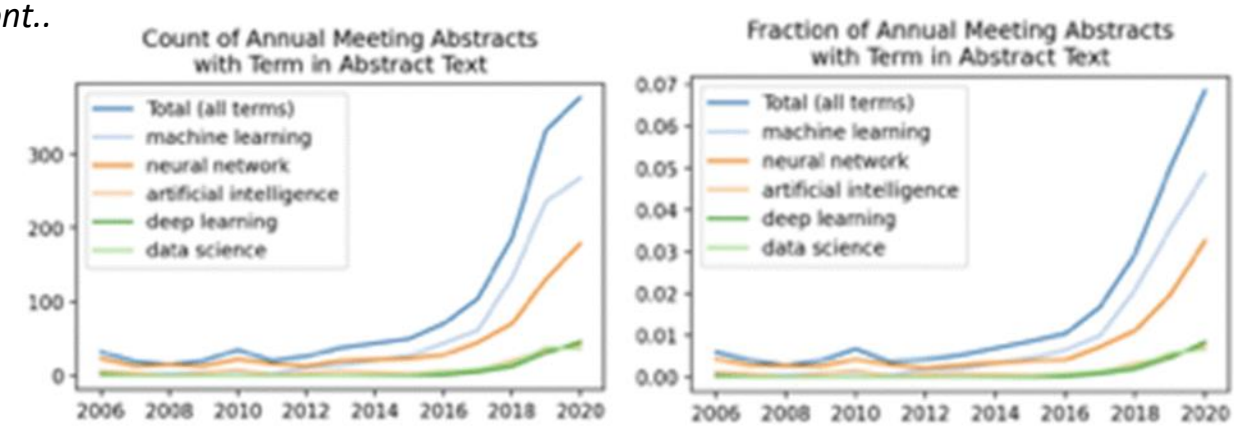


FIGURE 1 Count (top panel) and fraction (bottom panel) of American Institute of Chemical Engineers annual meeting abstracts that include terms related to data science, 2006–2020 (Extracted).

Chemical Engineering scope is also extended to the below key topics like pointed below as a part of industrial revolution to meet to the talk of the time.

Digitalization and Industry 4.0: Embracing digital tools like process simulation software, advanced modeling, and virtual reality for plant design and optimization, implementation of Industrial Internet of Things (IIoT) for real-time monitoring and control of processes.

Biotechnology and Green Chemistry: Increasing focus on sustainable and environmentally friendly processes. Integration of biotechnological methods for the production of chemicals and materials.

Advanced Materials and Nanotechnology: Utilization of nanomaterials for enhanced catalysis and novel material properties and development of advanced materials for more efficient and durable equipment.

Renewable Energy Integration: Integration of renewable energy sources in chemical processes, R&D of new catalysts for green energy production.

Process Intensification: Implementation of intensified processes for smaller, more efficient, and sustainable manufacturing and modular design for increased flexibility.

Blockchain Technology: Enhancing supply chain transparency and traceability.

Circular Economy Practices: Implementing strategies for waste reduction, recycling, and reuse. Designing processes with a focus on minimizing environmental impact.

By staying updated on these trends and incorporating these tools into their practices, chemical engineers can contribute to a more sustainable and efficient future for the industry.

References:

1. www.chemojo.com
2. https://www.aiche.org/publications/elibrary
3. What artificial intelligence can and can't do right now. Harvard Business Review. https://hbr.org/2016/11/ what artificial intelligence can and can't do right now.
4. National Academies of Sciences, Engineering, and Medicine. 2022. New Directions for Chemical Engineering. Washington, DC: The National Academies Press. https://doi.org/10.17226/26342.

Photo electrocatalysis for Wastewater Treatment: A Sustainable Approach

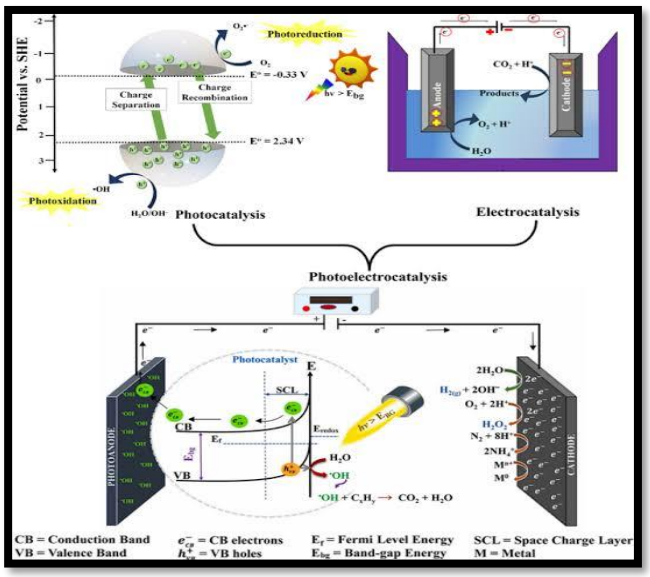
- Sudeep Wadia,
Asst Professor, Chemical Engg.,
UPL University

In the face of escalating environmental concerns, the quest for sustainable and efficient wastewater treatment methods has become paramount. One promising avenue of research is the application of photo electrocatalysis, a cutting-edge technology that harnesses the synergistic effects of light, electricity, and catalysts to purify water.

Photo electrocatalysis involves the use of semiconductors as photoanodes and photocathodes, which, when exposed to light, generate electron-hole pairs. This process initiates redox reactions on the surface of the catalyst, leading to the degradation of pollutants present in wastewater. The incorporation of electrocatalysts enhances the efficiency of the overall system by facilitating electron transfer, thereby accelerating the degradation kinetics of contaminants.

The utilization of solar energy is a key advantage of photo electrocatalysis, making it an environmentally friendly and sustainable solution. Harnessing the power of sunlight reduces the dependence on conventional energy sources, making the process both cost-effective and eco-friendly. Additionally, the photocatalytic degradation of pollutants results in the formation of harmless by-products, minimizing the environmental impact of wastewater treatment.

Furthermore, photo electrocatalysis offers a high degree of selectivity, allowing for the targeted removal of specific pollutants. This level of precision is crucial in addressing the diverse and complex nature of contaminants found in wastewater. By tailoring the catalysts and optimizing the process parameters, researchers can customize photo electrocatalytic systems to effectively treat different types of pollutants, ranging from organic dyes to heavy metals.



The application of photo electrocatalysis in wastewater treatment represents a significant step towards a more sustainable and efficient future. The integration of photo electrocatalysis into wastewater treatment processes has the potential to revolutionize the field, offering a greener and more effective solution to the global challenge of water pollution.

References:

1.G. Prasannamedha, P.S. Kumar, A review on contamination and removal of sulfamethoxazole from aqueous solution using cleaner techniques: present and future perspective, J. Cleaner Prod. 250 (2020), 119553.

2. Wang, Y., Zu, M., Zhou, X., Lin, H., Peng, F., Zhang, S., 2020. Designing efficient TiO2-based photoelectrocatalysis systems for chemical engineering and sensing. Chem. Eng. J. 381, 122605.

3.M. Yeganeh, H.R. Sobhi, M. Behbahani, M. Ghambarian, A. Esrafili, Photoelectrocatalytic degradation of sulphonamide antibiotics in aquatic media using a novel Co-doped ZnO nanocomposite: evaluation of performance, kinetic studies, Int. J. Environ. Anal. Chem. (2022)

Extraction of Gliptins

- Aniruddha Shinde,
Research Scholar (PhD Student), UPL
University of Sustainable Technology

Vildagliptin is an oral DPP-4 inhibitor approved in more than 70 countries (Cai et al., 2012). Gliptins, also called dipeptidyl peptidase-4 (DPP-4) inhibitors, are a class of oral antidiabetic drugs used in the treatment of type 2 diabetes mellitus. The common gliptins include Vildagliptin, Sitagliptin, Saxagliptin, Linagliptin, and Alogliptin (Srinivasa and Baradhi Krishna M., 2023). The most popular prescribed drugs are Vildagliptin and Sitagliptin. The extraction of gliptins doesn't typically involve natural extraction processes like those for plant-derived compounds. Instead, gliptins are primarily synthesized through chemical processes in pharmaceutical laboratories.

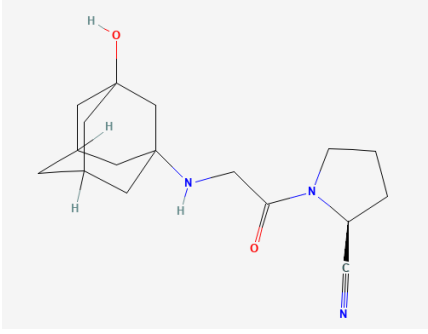
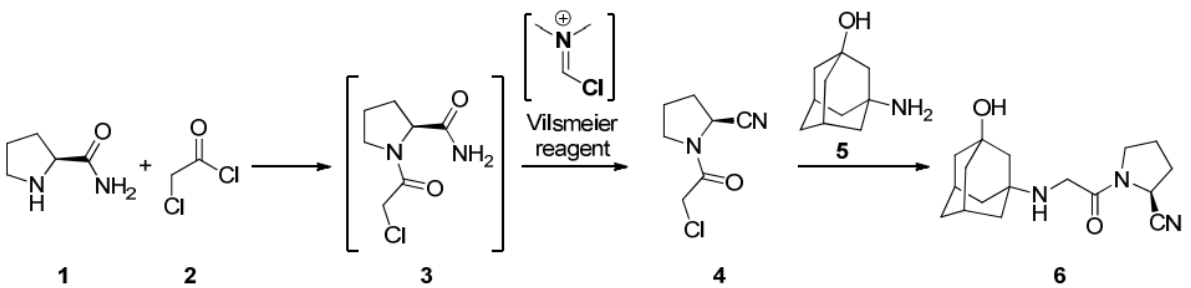


Fig.1. Chemical Structure of Vildagliptin
Source:www.pubchem.ncbi.nlm.nih.gov/compound/Vildagliptin

However, one of the significant challenges in the synthesis of gliptins is ensuring their purity and yield. Developing efficient and cost-effective synthetic routes to produce these compounds in high purity can be complex. It involves intricate chemical reactions, optimization of reaction conditions, purification techniques, and adherence to strict quality control standards. The general steps in the chemical synthesis of gliptins are Reaction → Extraction → Distillation → Crystallization → Centrifugation → Recrystallization→ Centrifugation → Drying → Milling (Size reduction) → Sifting →and Packing.

The synthesis of Vildagliptin involves three linear chemical steps starting from the readily available L-proline amide 1 and chloro-acetyl chloride (2). The N-acylated adduct 3 consecutively undergoes dehydration of the amide functionality mediated by VR to yield the cyanopyrrolidine 4. Alkylation of hydroxyl amino adamantane (HAAD) 5 with 4 in the presence of base provides Vildagliptin (6) (Pellegatti and Sedelmeier, 2015).

The synthesis route uses Vilsmeier Reagent which is a highly reactive and moisture-sensitive compound that requires special precautions to mitigate the risks of potentially dangerous incidences such as physical exposure or runaway reactions (Pellegatti and Buchwald, 2012)



Cont…

Extraction of Gliptins

Several green solvents, such as supercritical carbon dioxide (CO_2), ionic liquids, and water, have been explored for extraction purposes due to their low toxicity, recyclability, and minimal environmental footprint.

Supercritical CO_2 Extraction: This method involves using carbon dioxide in its supercritical state as a solvent. It's highly selective, non-toxic, and leaves no residue in the extracted material. However, its efficiency might vary depending on the specific gliptin compound being extracted.

Ionic Liquids: These are salts that exist in a liquid state at low temperatures. They have been considered for extraction processes due to their low volatility, non-flammability, and tunable properties. However, their application might be limited by cost and scalability.

Water-Based Extraction: Techniques like aqueous extraction or the use of subcritical water can be employed. Water is a safe, abundant, and non-toxic solvent. However, its use might be restricted based on the solubility of gliptins in water.

Selecting an appropriate extraction solvent is crucial, guided by criteria such as immiscibility with water, low toxicity (preferably green solvent or ICH class 3), solubility of gliptins, cost, safety, and recyclability (Castro-Puyana et al., 2017).

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Leveraging Biofertilizers and Circular Bioeconomy for Sustainable Intensification of Agriculture

- Kaushik Vaijapurkar,

M. E. Semester-1, Chemical Engineering,
UPL University of Sustainable Technology

The prevalent reliance on agrochemical inputs has raised concerns regarding soil degradation, negative health impacts, and environmental damage in conventional agriculture. However, the integration of plant growth-promoting microorganisms (PGPM) as biofertilizers and recycling of agricultural waste streams offer biological, circular solutions to enhance
productivity while restoring soil health and ecosystem services.

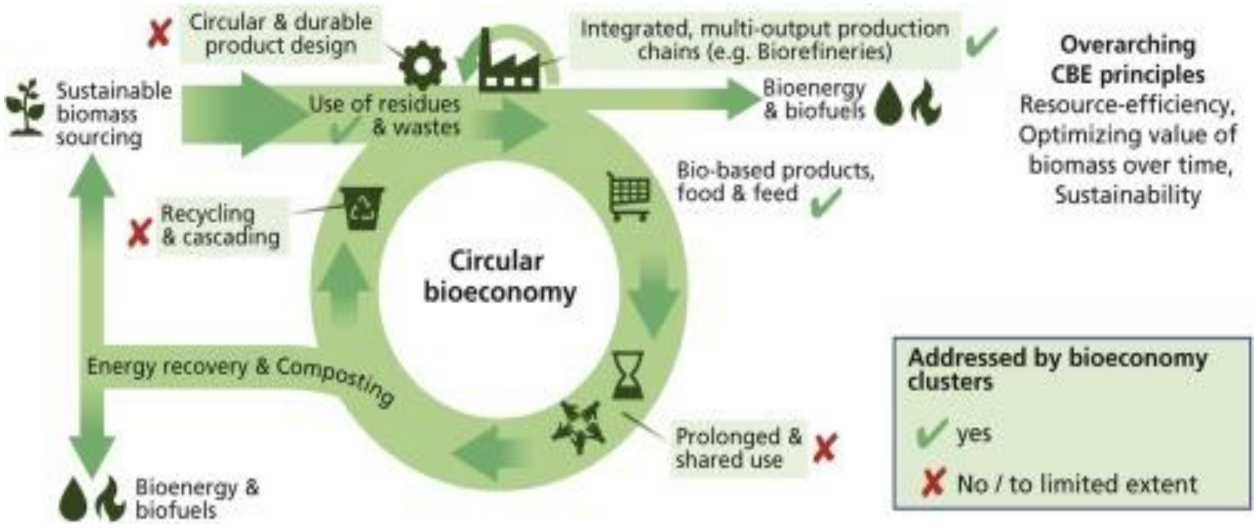
Biofertilizers containing rhizobial, azospirillum, phosphate-solubilizing, and cellulolytic PGPM can synergistically enhance soil nutrient availability, nutrient uptake efficiency, plant growth hormone regulation, and resistance to biotic and abiotic stresses. Field trials confirm that biofertilizer application as seed inoculants or soil amendments improve yields by 12-30% and nutrient use efficiency, reducing synthetic fertilizer requirements up to 50%. Further optimization via bioprospecting, microbial engineering, and innovative delivery mechanisms can boost cost-effectiveness.

Cont…

Leveraging Biofertilizers and Circular Bioeconomy for Sustainable Intensification of Agriculture

Additionally, industrial symbiosis through anaerobic digestion, composting, and microbial biomass production allows valorization of residues, converting waste into renewable biofertilizers and biopesticides. Applying a circular bioeconomy approach to agricultural production through ecological nutrients recycling and regenerative soil practices facilitates a fundamental transition away from linear fossil resource dependency.

A systems-level approach coupling microbial bio stimulants and waste upcycling with digital technologies, farmer training programs, and policy incentives is imperative to overcome barriers to adoption. This bio-based agricultural paradigm promises to enhance productivity and climate resilience while drastically curtailing carbon footprint, soil degradation, and pollution attributed to conventional practices. In the transition towards sustainable food systems, biofertilizers and agricultural waste recycling will catalyze regeneration, thereby heralding the next green revolution.



Group Photograph with cohort of B.E. Semester-V that attended one day workshop on CHEMCAD on 28th August 2023

Rising Scholars: Insights from Recent PhD

My research aims to develop models for forecasting biomass pyrolysis kinetics and product production. The specific objectives of this work were:

- Development of generic algorithms to estimate pyrolysis kinetics using analytical approaches.
- Machine learning approach to build models for prediction of biomass pyrolysis kinetics from preliminary analysis of biomass.
- Develop Artificial Neural Network based models for the prediction of biomass pyrolysis product distribution.

What was the real motivation to pursue PhD?

My teachers, including teachers in primary school to PhD guides, have consistently served as my sources of motivation, believing in me to pursue higher education from 10th grade to doctorate.

How did you manage to balance the full-time academic job and part time research work?

I always wanted to be a teacher, therefore I started working as a primary school teacher as soon as I finished my 12th Std. The classroom is where I usually enjoy being the most. Since stressing academic responsibility is my main duty as a teacher, pursuing my PhD was my part-time research project. Nevertheless, I have received great support from each and every one of my colleagues to help me proceed in my PhD while managing all of my other tasks so that I meet deadlines, complete requirements, and provide quality work..

What was the societal impact of your research?

As ANN-based modeling is becoming more popular these days, I attempted to relate it to chemical engineering by taking into account the kinetics and product distribution aspects of biomass pyrolysis. ANN based models developed in the PhD work are well capable for more accurate predictions and provide better insights into the pyrolysis process. By combining fundamental scientific principles with advanced machine learning techniques, we have unlocked a deeper understanding of biomass pyrolysis, contributing to the development of efficient and sustainable energy conversion technologies.

Can you discuss the challenge of integrating core chemical engineering principles with the emerging field of ANN?

Developing high-quality ANN models requires a large dataset. Since heat and mass transfer, in addition to chemical reactions, are involved in chemical engineering processes, a wide range of factors typically impact these processes. Generating experimental data for a broad range of operating situations is one of the obstacles in the way of ANN-based modeling.

What advice would you offer to those starting a PhD?

PhD is along journey of getting knowledge, building skills while having right attitude. Getting momentum and maintaining it for specific tasks is a biggest challenge, particularly as a part time researcher. It is my personal suggestion to a fresh research scholar to keep himself/herself engaged daily with the research work. Read at least abstract of not entire article. Continuity and perseverance is a key. Believe in hard work which always brings success to result.

INTERVIEW

Hemant Balsora
Asst. Professor,
Chemical Engineering
UPL University

ALUMNI Column

Congratulations Yash Goel ..!!

Yash (Alumni from Chemical Engineering admission batch 2015) starting a new job as 'Product Supply Manager' at **P&G**.

Looking back, my time at SRICT laid a strong foundation. The amount of support, guidance and motivation given by the department, administration and Panjwani Sir himself was what made a difference for me during my time at SRICT.
- Yash Goel

Our proud alumni, **Bhavik Mahant** from admission batch 2013 visited our campus and talked to mostly all Diploma and B.E. students. He delivered various sessions on Nanotechnology, Introduction to Chemical Engineering and motivated students to pursue their respective dreams. Bhavik is a research scholar at IIT Madras and a recipient of PM Research fellowship).

Five chemical engineering alumni (Diploma to Degree admission from batch-2013), visited college to talk to Diploma Engineering, Semester-5 students on "Career opportunities after diploma chemical engineering"

We feels happy and pleased to inform that Mr. Hemant Balsora has successfully completed his final PhD Viva Voce. He has published 5 high impact research publications, one book chapter and presented research work in 4 international conference during PhD work

Congratulations Dr. Hemant Balsora, Asst. Professor, Chemical Engineering Department, UPL University

Chemical Engineering Semester-5 students, Vinayak Sonawane attended and successfully completed the 12-Week NPTEL Certificate Program on 'Chemical Reaction Engineering-1'. He has been awarded an Elite Certificate. Congratulations to Vinayak

Elite

NPTEL Online Certification

(Funded by the MoE, Govt. of India)

This certificate is awarded to

VINAYAK BAJIRAO SONAWANE

for successfully completing the course

Chemical Reaction Engineering - I

with a consolidated score of 65 %

Online Assignments	25/25	Proctored Exam	39.87/75

Total number of candidates certified in this course: 13

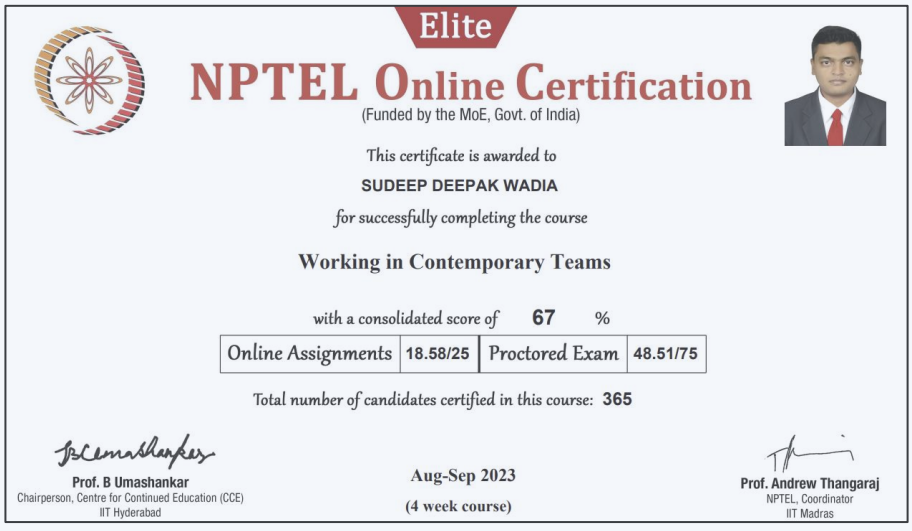
Jul-Oct 2023

(12 week course)

Prof. T. V. Bharat

Head, Centre for Educational Technology

NPTEL Coordinator, IIT Guwahati



Elite

NPTEL Online Certification

(Funded by the MoE, Govt. of India)

This certificate is awarded to

SUDEEP DEEPAK WADIA

for successfully completing the course

Working in Contemporary Teams

with a consolidated score of 67 %

Online Assignments	18.58/25	Proctored Exam	48.51/75

Total number of candidates certified in this course: 365

Prof. B Umashankar

Chairperson, Centre for Continued Education (CCE)

IIT Hyderabad

Aug-Sep 2023

(4 week course)

Prof. Andrew Thangaraj

NPTEL, Coordinator

IIT Madras

Mr. Sudeep Wadia, Asst. Professor has successfully completed two NPTEL courses:12-week course on Petroleum Formation Evaluation and 4-week course on Working in Contemporary Teams

ACHIEVEMENTS

Postgraduate (M.E.) Chemical Engineering student, **Mr. Manish Nasit** received UPL Gold Medal for scoring 10/10 SPI during 1st Convocation of UPL University

Akash and Nitin, Chemical Engineering students stood on first and third position, respectively during Essay Writing competition organized by EST department, UPL University

RECENTLY PUBLISED TECHNICAL ARTICLES

Sr. No.	Event attended/Achievement	Author
1	Artificial Neural Network based models for the prediction of biomass pyrolysis products from preliminary analysis, Ind. Eng. Chem. Res. 2023, 62, 36, 14311–14319	**Hemant Balsora, Kartik S**, JB Joshi, Abhishek Sharma, and Anand Gupta Chakinala
2	The The integrative approach of learning chemical engineering thermodynamics by using simulation-based exercises", Education for Chemical Engineers 45 (2023) 122–129	**Krunal J. Suthar** and Milind Joshipura
3	Design of a bio-sorption tower for reuse of agricultural run-off, *AIP Conf. Proc.* 2800, 020298 (2023), https://doi.org/10.1063/5.0167871	**Swapna Panda**, Sudeep Asthana; Dishali Asrani; Ram Singh Purty; Sayan Chatterjee
4	Process design for a low-cost portable green filter for water purification, *AIP Conf. Proc.* 2800, 020302 (2023)https://doi.org/10.1063/5.0164299	**Swapna Panda**, Sayan Chatterjee; Ram Singh Purty; Dishali Asrani; Prashant Kumar; Sudeep Asthana
5	Co-pyrolysis of printed circuit boards (PCBs): A review on current research and future prospects, Materials Today: Proceedings, 2214-7853, Oct 2023, https://doi.org/10.1016/j.matpr.2023.10.127	**Dr. Alok Gautam, Dr. Shina Gautam** and Dr. Sonal Prajapati

Dr. Alok Gautan, Dean – R&D, received grant worth 21.68 Lakh for the research topic "Recovery of valuable metal from organic waste" from Lanxess India Pvt. Ltd.

Other Activities

Dr. RAKESH SINHA, Asst. Professor from Chemical Engineering Dept attended training program on "Latest Development in Safety & Optimum Operation of Reactor, Distillation and Heat Exchanger in Chemical Industries" at BDMA on 29th Sept.

Mr. Sunil Badgujar attended 5-day (online) FDP on "Recent Trends in Exergy and Sustainability" from MIT, Pune during 21st to 25th August 2023

Dr. Ravindra Kanawade, Associate Professor from Chemical Engineering department along with Dr. Omprakash Mahadwad, Dean – Engineering and CoE attended a conference on Phosgene Safety at Vadodara on 31/08/2023

Dr. Dinesh Pandey, Asst. Professor from Chemical Engineering along with Mr. Karan, Asst Professor from EST department attended inauguration of FirePlex at GSFC University on 23rd September 2023

Dr. Shrikant Wagh, Dr. Krunal Suthar, Dr. Swapna Panda, Dr. Dinesh Pandey, Mr. Sunil Badgujar and Dr. Hemant Balsora attended evening talk on water technology by M/s Chembond water technologies Ltd. The event was organized by IIChE – Ankleshwar Reginal Centre

Pooja on Vishwakarma Jayanti (16th Sept 2023) was coordinated by Mechanical Engineering Department. The prayers were offers across all departments including Chemical Engineering.

Other Activities

Training Program for Employees of Insecticides India, Dahej

The technical session was conducted at Insecticide Ltd that was aimed to impart knowledge on various unit operations in Environmental, chemical and engineering topics. Four modules were delivered by Chemical Engineering faculty members (Distillation & Scrubber, Mixing, Filtration & Centrifugation, Drying and Utility systems). The session encompassed comprehensive discussions and presentations on these topics.

Training Program for Plant Operators of Lupin Ltd, Ankleshwar

The training program was delivered to plant operators of Lupin Ltd. The training program consisted of 10 modules, each focusing on distinct unit operations fundamentals. The primary objective was to empower plant operators with a robust understanding of essential unit operations integral to pharmaceutical manufacturing processes.

Other Activities

Semester-VII Students will be going for six months in-plant training during next semester. Students were oriented and necessary information was shared by Mr. Sunil Badgujar, Asst. Professor, UPL Univ.

Parents Teacher Meeting

The Department of Chemical Engineering organized a Parents Teacher Meeting (PTM) for Diploma and Degree Engineering students of Semester-V held on 4th November 2023 at UPL University of Sustainable Technology.

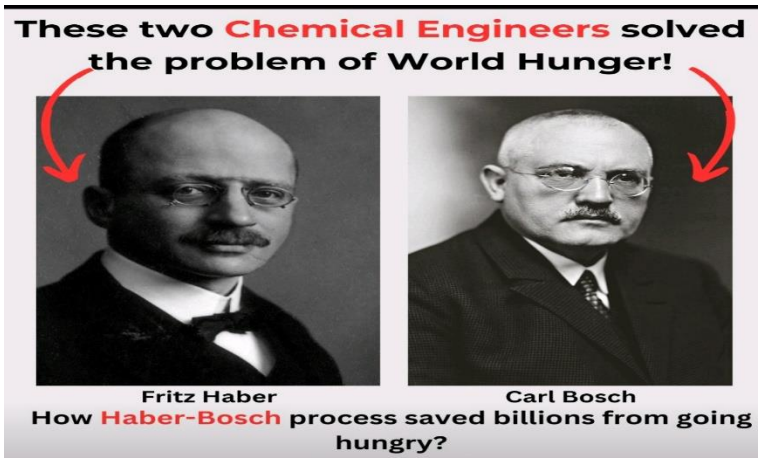
Chemical Engineering Students during Sci-Technovation

Chemical engineering students wholeheartedly participated in a blood donation drive.

Student's Corner

DO YOU KNOW!!!!

By Utsav Pankaj Patel
BE, Chemical Engineering, Sem-VII



Without the Haber-Bosch process, we would only be able to produce around two-thirds the amount of food we do today!

Haber was among the first Industrial chemists to be able to synthesize ammonia in a high-pressure reactor giving a yield of 15%.

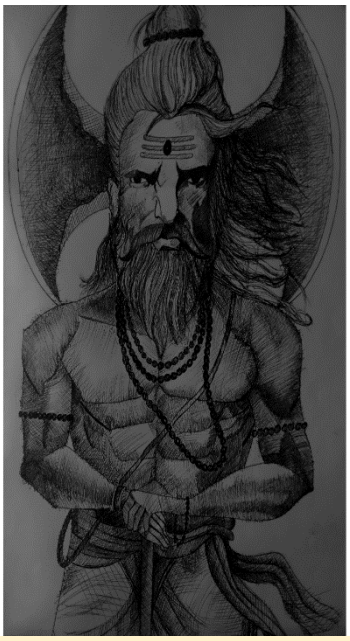
However, the process needed to be scaled up and there were 3 major challenges in front of Carl Bosch from BASF who was assigned this task.

1. Raw Material Supply: The first challenge was securing a cost-effective supply of hydrogen and nitrogen, essential raw materials for the Haber-Bosch process.
2. Catalyst Development: Another crucial problem involved developing catalysts that were both effective and stable to facilitate ammonia synthesis efficiently.
3. High-Pressure Reactor Design: The construction of the necessary apparatus for the process was identified as the third major challenge that needed resolution before establishing a plant for the synthesis of ammonia.

Alongside Carl, his assistant, chemist Alwin Mittasch, did some 20,000 experiments to perfect a mixed catalyst based on iron oxide. It was the first of its kind and performed as well as osmium and uranium and was readily available and cheap. For hydrogen supply, they opted and improved the water-gas shift reaction. Bosch's pivotal achievement in the Haber-Bosch process lay in overcoming the challenges of high-pressure chemistry by designing a robust reactor.

Amidst the infancy of this field, existing equipment fell short, necessitating Bosch's remodeling of Haber's original design. Approximately 24 of these redesigned reactors ran incessantly during the catalyst search, offering crucial insights. Bosch's success in creating a reliable reactor marked a turning point in the synthesis of ammonia, addressing a critical obstacle and laying the foundation for large-scale applications. The first plant to use the Haber-Bosch process at the industrial scale started up at BASF Oppau in 1913. Nearly 100 years on nothing much has changed, and the process is still used around the world.

Student's Corner



Sketches by Mahesh Pal (BE Sem-VII)

Sketch by Sakshi Dighe (DE Sem-V)

Photographed by
Kundan Salunkhe (DE Sem-V)

Sketch by Devanshi Parmar (DE Sem-V)

FROM THE DESK OF EDITOR..

The 12th issue of CHEMEZINE (Chemical Engineering e-Magazine) presents the activities conducted throughout the semester. We celebrated independence day, felicitation program, lot of IIChE activities, SCI-TECHNOVATION and many other events during the last semester along with various co-curricular activities. We tried covering most of our activities. Thanks to all our stakeholder for their contribution. We invite more participation from stake holders of our department. We invite unpublished interesting articles from students and staff members of chemical engineering department.
Kindly provide your valuable feedback. HAPPY READING AND DO WRITE US BACK.

Obituary

With heavy hearts, we bid farewell to a beloved trustee and distinguished senior Rotarian. He played a pivotal role in the establishment of SRICT. His commitment to community service extends beyond the realm of medicine, as they have actively engaged in fostering growth during the nascent stages and have achieved mastery in diverse industrial endeavors. Our deepest gratitude to the Departed Soul and condolences to the family.

We feel proud and happy to share that our university's President, Mr. Ashok Panjwani received eminent engineer award for contribution in the field of Chemical Engineering. The prestigious award was presented by INSTITUE OF ENGINEERS (INDIA) on 7th September 23 at National Institute of Technology, Trichy.

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