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## CHEMICAL ENGG. (M.Tech Dual 5Y)

### EDUCATION

Year	Degree/Exam	Institute	CGPA/Marks
2013-18	M.TECH Dual Degree 5Y	IIT Kharagpur	7.75 / 10
2010-12	Bihar School Intermediate Examination	Bihar School Intermediate Examination Board (BSEB)	78.80/100
2010	All India Secondary School Examination	Central Board of Secondary Education (CBSE)	9.80 / 10

### WORKING EXPERIENCE

#### Graduate Engineering Trainee (Reliance Industry Limited Hazira, July 2018- April 2019)

- Developed understanding of Naphtha Cracker plant; Cracking in furnaces to separation of products like ethylene, Propylene.
- participated in routine plant activities, it's risk assessments, isolation and handling of process equipment for maintenance.
- performed Heat Exchanger adequacy test using HTRI, ASPEN for Cracker plant DBN to 119 TPH ethylene production.
- Worked as DCS panel officer observing process parameters trends, Issuing permit and troubleshooting

### INTERNSHIPS

#### Modelling of Affinity chromatography column (Dr. Reddy's Laboratories, May 2017-July 2017)

- Developed mathematical model for API sample loading in Affinity chromatography column using **MATLAB** 2016.
- Simulated developed model to quantify sample loading time, Flow through concentration profile, capacity of smaller affinity column.
- Estimated Model parameters using volume Pulse analysis and Isotherm concentration curves with HPLC and OD280 method.
- Predicted behavior of large column using above model and validated experimentally with estimate R-squared = 0.9867, p-value = 0.0017.
- Prepared regressive model to predict declining trends in binding capacity of resin Nickel-complex for given column cycle and amount.
- Performed economic analysis of proposed model optimizing loading time and estimated 10% cost reduction in every batch.

#### Enhancement in Octane Number of gasoline (Indian Oil Corporation Limited, May 2016-July 2016)

- Detailed literature study to suggest alternative methods to upgrade Octane Number of Gasoline in MSQ unit of refinery.
- Proposed design reform like inter stage H<sub>2</sub>S removal, addition of extra reactor in series, utilize Silico-aluminate catalyst for reformat.
- Developed understanding of Process flow and P& ID of Naphtha stabilizer column and simulated it's model in **ASPEN**.
- Mass and Energy balance is performed to find exact amount of Hydrogen required to remove Sulphur (~2%) from Naphtha column.

### PROJECTS

#### Modelling and Simulation of Composites Components used in Space crafts (M. Tech Project, Aug 2016-April 2018)

- Modelling and Simulation of shrinkage and warpage of composite components used in Spacecraft (Sponsored project by ISRO)
- Characterization of Resin and fiber properties for quantification of imperfection, Its impact on strength and failure of composites.
- Determination of Mechanical and thermomechanical properties of each layer of Fiber-reinforced square composites laminates.
- Modelling of Incremental and total shrinkage and warpage happening during entire cure cycle in Autoclave chamber is performed.
- Simulation of incremental change in 3-D distorted shaped laminate consisting of 12 (0/90) lamina is predicted using **MATLAB**.
- Spring -In Angle effect of Corner shaped laminate like L and C shaped structures is visualized using APDL features of **ANSYS**.

#### Predictive Modelling of Bioethanol production from Pineapple leafs (Chem-Quest Inter-Hall Event, March 2017)

- Identified modelling process and parameters, types of reaction kinetics, quantified parameters effects, simulated rate model in **MATLAB**.
- Checked Logical correctness of Model, performed sensitivity analysis, fitted regressive model for Non-competitive inhibition process.
- Prepared flow diagram of Batch plant, Effluent treatment scheme, process design, Reactor and Agitator Design, System Power calculation.
- Implemented proposed design on lab scale, performed mass balance for each batch, economic comparison with existing methods is done.

### SKILLS AND EXPERTISE

- Excellent core knowledge, Exposure to designing of process equipment like distillation column, Heat Exchanger Cooling Tower.
- Hand on experience on simulation software like ASPEN, ANSYS, MATLAB and C programming language.
- Quite creative, dedicated, & sincere, team player, good at managing time and people along with positive thinker & solution oriented.
- Relevant Courses like Optimization techniques, Computer Aided Process Design, Advanced Heat and Mass Transfer, Process control.

### POSITIONS OF RESPONSIBILITY

#### Inter Hall Chem-quest Captain, Nehru Hall of Residence IIT KGP (July 2016-April 2017)

- Effectively managed team to resolve given problem statement correctly within stipulated time and also won silver medal in competition.
- Assigned tasks to different group of people, gave respect and freedom to explore, communicated about deadline, kept strong faith in team.
- Surveyed various existing method for reducing QI contact from (~5%) from coal tar pitch and also gave best recommendation for plant use.
- Performed Batch scale investigation to check its competency and cost analysis is done to predict saving per process cycle using **MATLAB**.

### EXTRA CURRICULAR ACTIVITIES

- Sports & Games: Member of Inter Hall championship Cricket Team and Athletic team of Nehru Hall of Residence 2015-16.
- NSS: Group leader at unit 02, responsible for cloths distribution, Blood donation and teaching underprivileged students of village.
- Kshitij: Active Volunteer in hospitality Team during Tech feast, arranged accommodation for record number of participants that year.