



# IIT HYDERABAD

Chemical Engineering Department  
Brochure 2022-2023





## **MESSAGE FROM HOD**

### **DR. KISHALAY MITRA**

***“The Department of Chemical Engineering at IIT Hyderabad is one of the growing Chemical Engineering Departments in the country and has an excellent fast reputation in teaching and research, built over the last 10 years”.***

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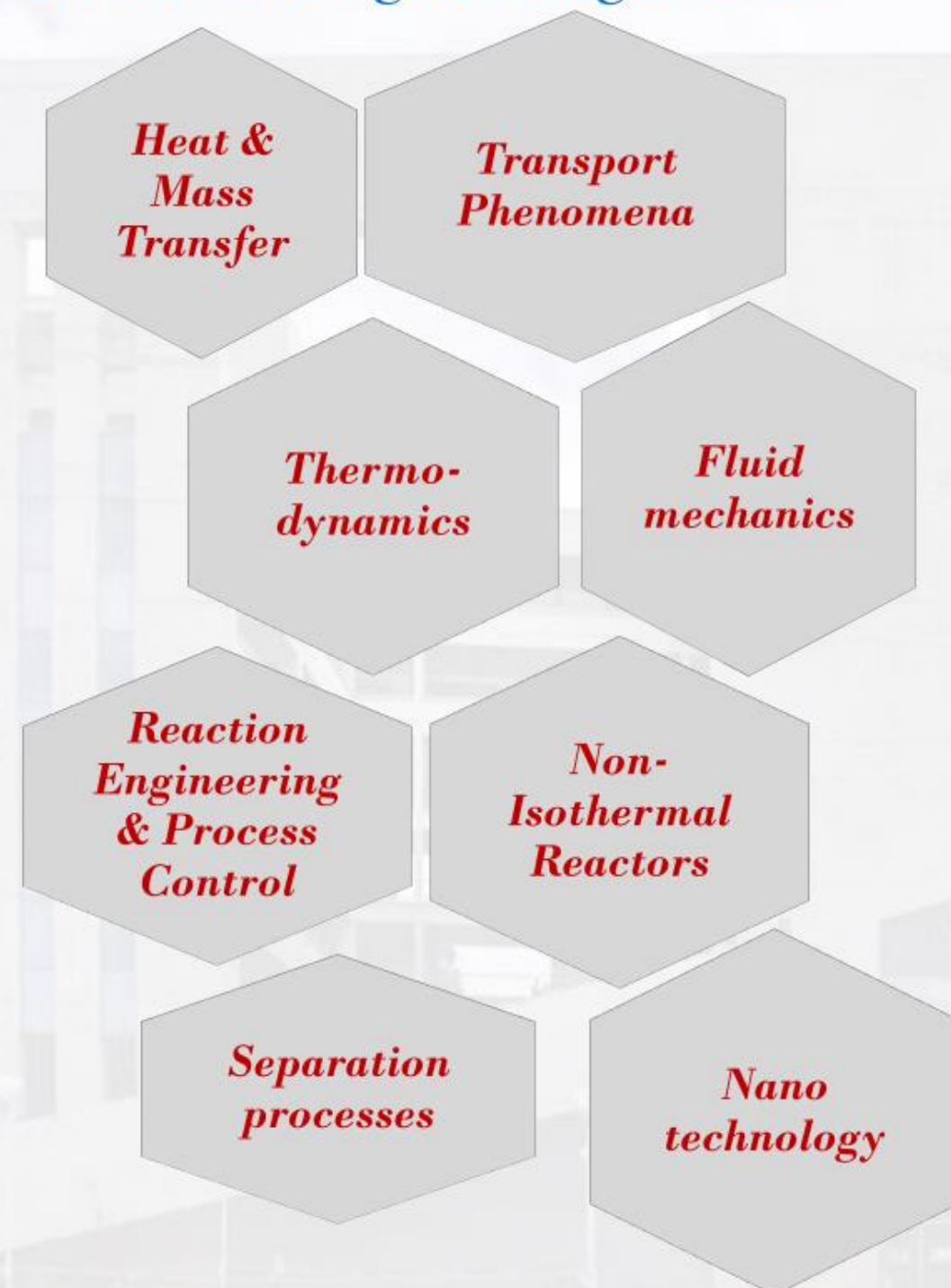
- **The Teaching covers various aspects of Chemical Engineering, Bio-chemicals, Advance materials and applications of Artificial Intelligence and Machine Learning in Chemical Engineering.**
- **With 22 faculty members engaged in cutting edge research, we provide quality programs in Chemical Engineering education, research and development and expert consulting support to process industries.**
- **Our research transcends the traditional disciplinary boundaries and expands into diverse areas. Our close interaction with industry ensures that the research is relevant and results in robust balance of fundamental and applied research in the department. This is reflected in the department outstanding track record of attracting industry and grant-in aid funding for research projects, industry consultancy and fellowships.**



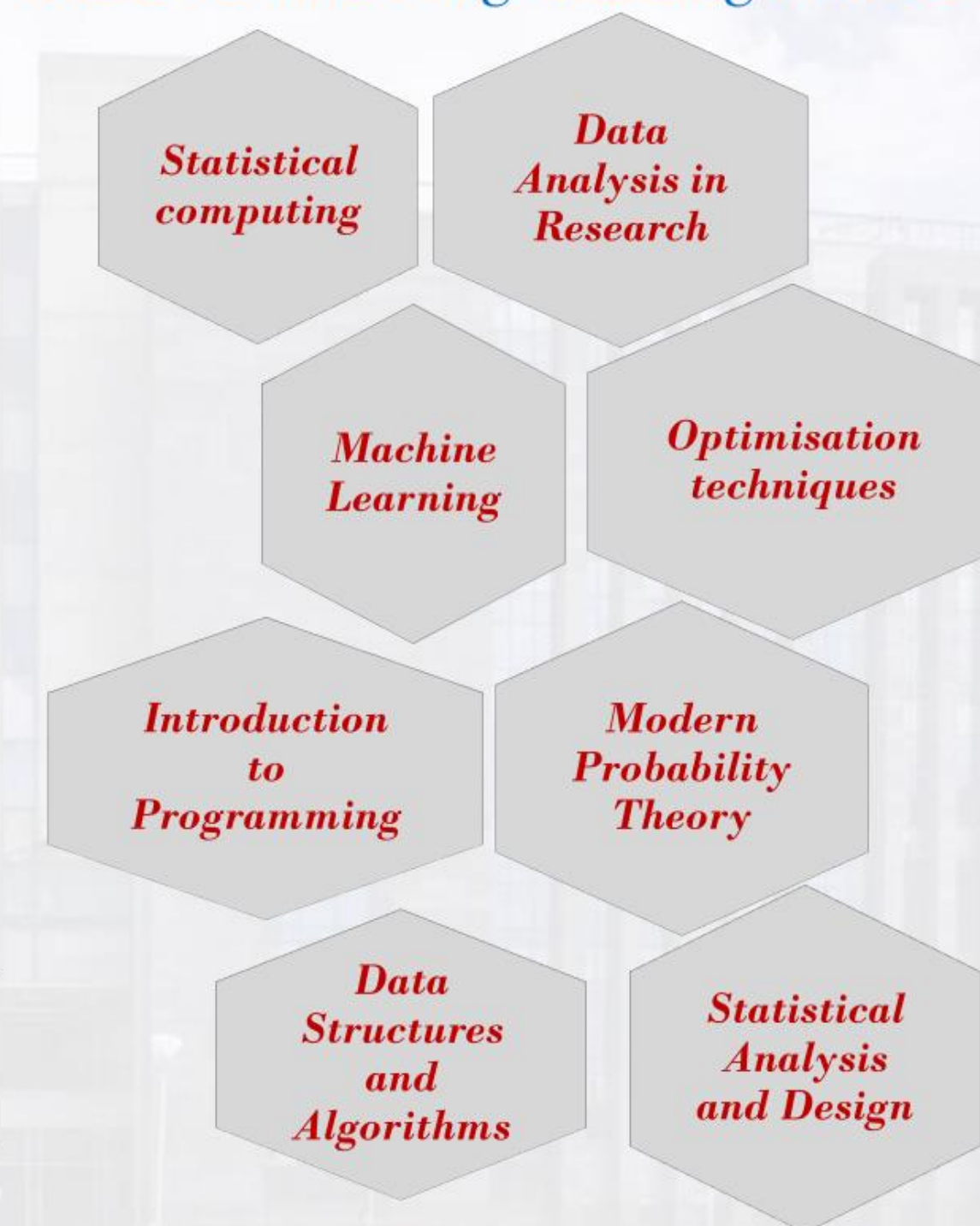


# COURSE STRUCTURE

## Chemical Engineering courses



## Statistics and Programming courses



- The BTech program encompasses a wide variety of courses which prepares a student for both industry as well as research. A BTech degree is awarded on completion of 129 credits of which 74 credits are allocated for core as well as dept electives.

- MTech program features a curriculum that is both comprehensive and flexible. Students are encouraged to actively formulate and solve innovative research problems. A MTech degree is endowed after accomplishment of 52 credits. The program culminates in an MTech thesis describing the student original research.



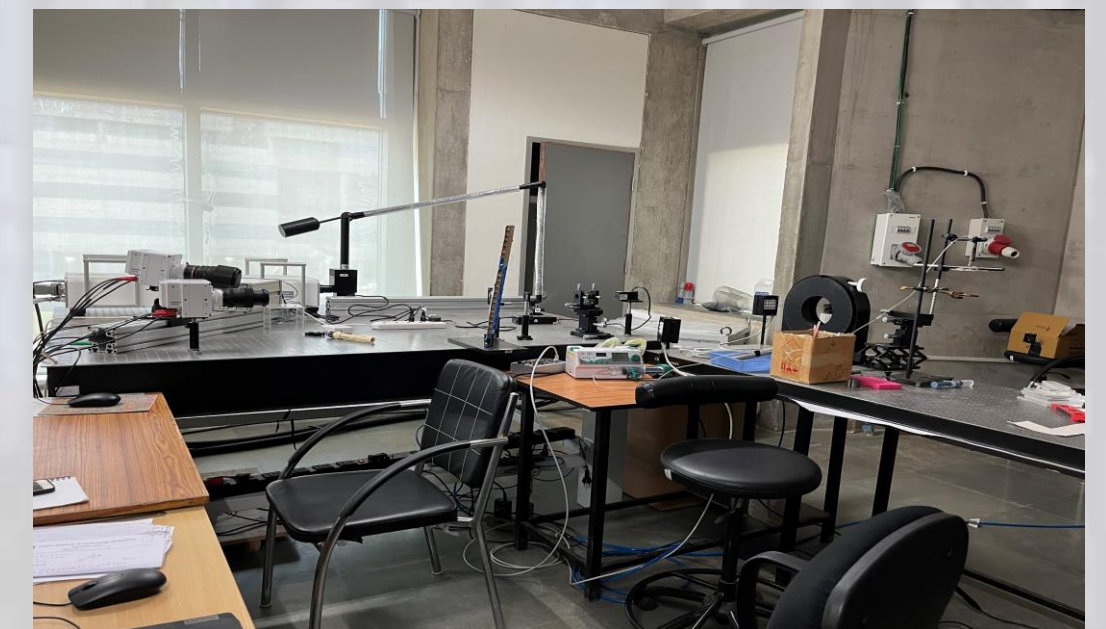
# LAB COURSES & RESEARCH LABS

In order to strengthen the core practical knowledge, the students are trained in various lab courses which include

- **Heat Transfer & Fluid Mechanics Lab**
- **Unit Operations & Reaction Engineering Lab**
- **Process Simulation Lab**
- **Mass Transfer & Control Lab**
- **Process Engineering Lab**
- **CFD Lab**

Apart from the core labs, the department is equipped with the state of art lab facilities dedicated only to various experimental and computational researches. These include

- **Microfluidics Lab & Cardiovascular Mechanics and Complex Fluids Lab**
- **GOKUL**
- **Creative & Advanced Research Based On Nanomaterials Lab**
- **Poly Nano Bio Lab & Multiphase Lab**
- **Mineral Processing & Fuel Cell Labs**
- **Industrial Bioprocess and Bio-prospecting Lab**





# RESEARCH AREAS

*The twenty-two  
faculty members  
are engaged in  
advanced research  
in the various  
aspects of  
chemical  
engineering.*

**Advanced  
materials**

**Polymer Science  
and Engineering**

**Heterogenous  
catalysis**

**AI & ML in  
chemical  
engineering**

**Computational  
and Systems  
Biology**

**DFT & Molecular  
Dynamics**

**Mineral  
processing**

**Energy  
conversion &  
storage**

**Fluid  
Mechanics**

**Process Systems  
Engineering**

**Techno-  
economics  
Analysis**

**Bio-engineering &  
Biotechnology**

# RESEARCH WORKS

- ❖ **Dr Alan Ranjith Jacob:** Development of hybrid gel for supporting medium (bath ) for 3D printing, to achieve withstanding temperature for supporting medium  $>38^{\circ}\text{C}$ .
- ❖ **Dr. Anand Mohan:** Lattice Boltzmann Simulation for Blood flow by extending Newtonian LBM solver to simulate a Non-Newtonian constitutive model for blood.
- ❖ **Dr. Balaji Iyer Vaidyanathan Shantha:** Studying the effect of bond kinetics on the dynamics of cross-linked polymer-particle hybrid networks.
- ❖ **Dr. Chandra Shekhar Sharma:** Optimization of electrolyte system for Lithium - Carbon dioxide batteries.
- ❖ **Dr. Debaprasad Shee:** Reductive depolymerization of corncob lignin using supported metal catalyst to produce bulk aromatics.
- ❖ **Dr. Devarai Santhosh Kumar:** Producing powdered form of mushroom and observe its metabolites for value added and medicinal applications.

# RESEARCH WORKS

- ❖ **Dr. Kirti Chandra Sahu:** Studying the accelerated chemical synthesis in Leidenfrost microdroplet.
- ❖ **Dr. Kishalay Mitra:** Utilizing deep convolutional neural networks (DCNN) for feature learning from images, recurrent neural networks (RNN) for sequence learning problems (time-series data), and optimization of these models in various chemical, metallurgical and agricultural data.
- ❖ **Dr. Lopamudra Giri:** Development of computational tools to build models based on artificial intelligence (AI) that can predict the major profiles obtained during production of drugs/vaccines.
- ❖ **Dr. Mahesh Ganesan:** Quantifying structural features of three-dimensional colloidal gels from fuzzy image volumes.
- ❖ **Dr. Narsimha Mangadoddy:** Improving the efficiency of spiral concentrator using low grade chromite ore, characterization of non- spherical particles and rheological behavior under high and low shear rate, improving extraction efficiency using flotation technology of zinc-led tailings.



# RESEARCH WORKS

- ❖ **Dr. Parag D Pawar:** Computational modelling of antibiotic resistance in bacterial biofilms.
- ❖ **Dr. Phanindra Jampana:** Electrochemical modelling of lithium-ion batteries for the purpose of state of charge estimation and fault detection in battery packs in battery management system(BMS).
- ❖ **Dr. Praveen Meduri:** Green hydrogen synthesis by water splitting using solar energy.
- ❖ **Dr. Ramkarn Patne:** Instabilities in fluid flow and Additive Manufacturing. The study of hydrodynamic stability aims to find out if a given flow is stable or unstable, and if so, how these instabilities will cause the development of turbulence.
- ❖ **Dr. Saptarshi Majumdar:** Multiscale Design of Polymeric Biomaterials- Experimental &/or Simulation Studies for Customized Applications. Our group focuses on designing of hydrogel without cross linkers that reduces toxicity risks during stages of clinical translation.

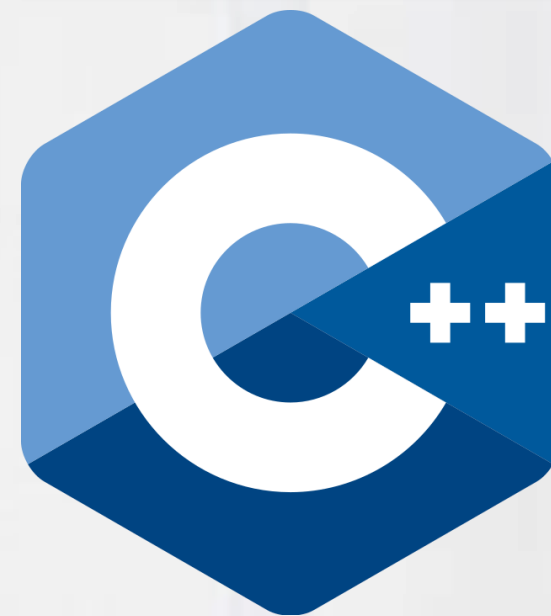


# RESEARCH WORKS

- ❖ **Dr. Satyavrata Samavedi:** Developing electrospun meshes functionality with multiple drugs offering spatio-temporally controlled release for various therapeutic applications.
- ❖ **Dr. Shelaka Gupta:** Design of Transition State Metal Based Catalyst for the Hydrodechlorination Reaction in Waste-water Treatment.
- ❖ **Dr. Suhanya Duraiswamy:** Synthesizing the metal nanoparticles on a microfluidic chip. Metal nanoparticles have a wide range of applications in various fields i.e, medical, electrical, cosmetics, pharmaceuticals etc.
- ❖ **Dr. Sunil K. Maity:** Working on hydrodeoxygenation of vegetable oil, steam and oxidative steam reforming, conversion of biobutanol to gasoline, butylenes, and aromatics hydroxyalkylation-alkylation reaction, and hydrocarbon biofuels from platform chemicals.
- ❖ **Dr. Vikrant Verma:** Multi scale approach to study hydrodynamics in a gas solid fluidized bed.
- ❖ **Dr. Vinod Janardhan:** Studying the quantification of water-gas shift reaction during co-electrolysis in SOEC



# SOFTWARES TRAINED



**& Many more...**



# OUR PAST RECRUITIERS





# CONTACT US

## FACULTIES IN CHARGE

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## PLACEMENT OFFICE

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**(040) 2301-7066**

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**Placement Website:**

**https://ocs.iith.ac.in/**

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❖ **Kindly register at the recruiters' corner in the placement website.**