Message from Faculty Coordinator

The sustenance and growth of the industry depends on the regular supply of quality human resources. The Department of Chemical Engineering at IIT Kanpur provides a rigorous academic curriculum and a vibrant learning environment to prepare quality students at the Bachelors, Masters and Doctoral level for the challenges of the industry. With the cutting edge research undertaken by the faculty in areas of core Chemical Engineering and various inter-disciplinary areas, in tandem with R&D processing industries in India and abroad, the Department continues its legacy as a premier seat of professional education. This is attested by our alumni who have distinguished themselves in the academia, industry and entrepreneurship. The current batch of students will continue in this rich tradition and will be valuable assets to the organizations.

Dr. Siddharth Panda
Dr. Anurag Tripathi
THE DEPARTMENT

About The Department

The Department of Chemical Engineering at IIT Kanpur is ranked among the nation’s top schools in Chemical Engineering, and is endowed with a highly competitive undergraduate program, a vibrant graduate program and a distinguished faculty that has earned national and international honors. Aside from excellence in fundamental research, the department has made significant contributions to the chemical industry through its expertise in chemical process engineering, simulation, optimization and control, polymers, interfacial phenomena and separations.

Experimental research in the department is supported by state-of-the-art facilities which include scanning tunneling and atomic force microscopes, ellipsometer, rheometers, high pressure liquid chromatograph, temperature programmed analyzer, etc. IIT Kanpur was chosen by the Department of Science and Technology (DST) as one among the five places in India to have operational state-of-the-art Nano-technology centre, which is located in the Department of Chemical Engineering. Under the auspices of the FIST scheme of DST, several new facilities has been established.

Facilities

- PG Research Laboratory
- Centre of Nano-Technology
- FIST – DST
- Samtel Centre of Display Technology (SCDT)

Following are some of the equipment available in the laboratories:

- PARTEC CyFlow Space Flow Cyclometer
- AAS-Agilent GTA 210 Atomic Absorption Spectroscopy
- Thermo gravimetric Analysis
- High Resolution Scanning Electron Microscope
- Altamira Catalyst Characterization Unit with mass-spectrometer
- Dispersive Raman Spectrometer
- UV-vis-NIR Spectrophotometer
- Continuous High Pressure Flow Reactor & High Pressure Batch Reactor
- Surface Area and Pore size Analyzer
- Continuous Flow Stirred Tank Reactor
- Determination of Particle Size and Zeta Potential of Materials
- Supercritical Fluid Extraction – SFE 500MR
- Gas Chromatography – Mass Spectroscopy
- HIGEE Distillation Set up
- High Performance Liquid Chromatography [HPLC]
- Capillary Condensation Flow Porometer
- Brewster Angle Microscope
- Nano Imprint Lithography
STUDENT PROFILE

ACADEMIC PROGRAMMES

**B.Tech.**
- Admission through JEE
- 4 Year Programme
- Basic Engineering + Departmental Courses
- Undergraduate Projects

**B.Tech.-M.Tech. Dual**
- Admission through JEE
- 5 Year Programme
- Basic Engineering + Departmental Courses
- M.Tech. Thesis 1.5 Years

**M.Tech.**
- Admission through GATE
- 2 Year Programme
- Compulsory Departmental Courses
- M.Tech. Thesis 1.5 Year

**Minor**
- Students can opt for minors in other departments on basis of their interest
- Basic Engineering Courses

STUDENT DEMOGRAPHICS

- B.Tech.: 72
- M.Tech.: 18
RELEVANT COURSES

Basic Courses:
- Thermodynamics
- Fluid Mechanics and its Applications
- Heat Transfer and its Applications
- Mass Transfer and its Applications
- Chemical Process Industries
- Process Dynamics and Control
- Chemical Reaction Engineering
- Biochemical Engineering
- Transport Phenomenon
- Numerical and Mathematical Methods in Chemical Engineering

Specialisation Courses:
- Petroleum Refinery Engineering
- Computer Aided Process Control
- Modelling and Simulation of Separation Processes
- Principles of Heterogeneous Catalysis
- The Structure and Rheology of Complex Fluids
- Process Engineering
- Optimization
- Chemical Plant Safety and Hazard Assessment
- Process Engineering Principles in Microelectronic Fabrication
- Reaction Engineering of Polymers
- Environmental Pollution: Control, Design and Modelling
- Mechanics of Soft Matter
- Statistical Thermodynamics
- Nano-sciences and Micro-fluids
- Molecular Simulation
- Hydrodynamic Stability

Laboratory Courses:
- Chemical Process Simulation
- Unit Operation and Process Control
- Chemical Engineering Design (process simulation using ASPEN PLUS, conceptual design of reactors, pressure vessels, distillation columns, cost estimation and profitability analysis, HAZOP and safety in design, etc.)

Modelling Exposure:
MATLAB, ASPEN PLUS, Fluent, COMSOL, HYSYS, etc.

Students also pursue Specialisation Courses from other departments
## PROJECTS & INTERNSHIPS

<table>
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<tr>
<th>Summer Internships</th>
<th>Many students undergo an industrial internship/training at the end of 2\textsuperscript{nd} and 3\textsuperscript{rd} year.</th>
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<td>These industries primarily deals with area of core chemical engineering like chemical synthesis, clean energy, FMCG, oil services, pharmaceuticals, food processing, petroleum etc.</td>
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<td>The projects assigned to the students involve many aspects of an industry like sales, improving profits, efficiencies, meeting targets as well as R&amp;D.</td>
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<td>This gives the students a direct industrial exposure and instils in them healthy professional ethics.</td>
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<tr>
<th>Undergraduate Projects</th>
<th>Students take up research and industrial projects under a faculty guide in their 3\textsuperscript{rd} and 4\textsuperscript{th} years.</th>
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<td>Students can take projects in other departments.</td>
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<tr>
<th>M.Tech. Thesis</th>
<th>M.Tech. and Dual Degree students do a 3 semester long thesis involving an in-depth study and work in one of the contemporary research areas.</th>
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<td>Dual Degree students, besides completing UG courses, take up specialized courses along with M.Tech. students, in addition to the thesis.</td>
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<td>The work done in these projects and thesis often results in patents and paper publications in leading journals and conferences.</td>
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In addition, the Unit Operations, Process Control & Design Labs and other course projects involving various tools, like MATLAB, COMSOL, ASPEN PLUS, HYSYS and FLUENT, equip the student with sufficient practical skills.
RESEARCH AREAS

- Computational Fluid Dynamics, Flow and Rheology of Complex Fluids
- Petroleum Refinery Operations and Processes, Heterogeneous Catalyst Theory
- Advanced research pertaining to Nano-science, Micro-fluidics, Micro-fabrication
- Soft-matter, Chemical Sensor Technology, Multifunctional Materials
- Environment Pollution Abatement Strategies
- Process Simulation and Plant Wide Control Strategies
- Interfacial Thermodynamics and Molecular Simulation
- Modern Separation Processes and Novel Applications
- Bioinformatics, Optimization and Flexibility Analysis of Biochemical System

INDUSTRIAL COLLABORATION

Besides fundamental research, the department is involved in a large number of industrial projects. Students get immense exposure in dealing with real life engineering problems by taking part in such sponsored research.

Some of the prominent names funding research are:

- Chevron Corp. Ltd.
- Hindustan Unilever Ltd.
- BOC
- DRDO
- Shell
- GAIL
- IOCCL
- HPCL
PAST RECRUITERS
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