# SCHOOL OF CHEMISTRY & BIOCHEMISTRY

THAPAR INSTITUTE
OF ENGINEERING & TECHNOLOGY
(Deemed to be University)

**1956**
*Thapar College is established*

**1964**
*Thapar College is renamed as Thapar Institute of Engineering & Technology (TIET)*

**1985**
*Thapar Institute of Engineering & Technology (TIET) granted full autonomy and status of deemeduniversity*

**2002**
*School of Chemistry and Biochemistry launched*

**2006**
*Thapar Institute of Engineering & Technology (TIET) celebrates 50 golden years*

50

**2007**
*L.M. Thapar School of Management is established*

**2013**
*L. M. Thapar School of Management shifted to new state of the art campus*

**2014**
*Thapar Institute of Engineering & Technology and Trinity College, Dublin, sign a historic institutional Collaboration Agreement*

**2015**
*School of Mathematics (SoM) was established as an independent entity in 2015 to promote teaching and research in mathematical sciences*

SoM

NAAC A+

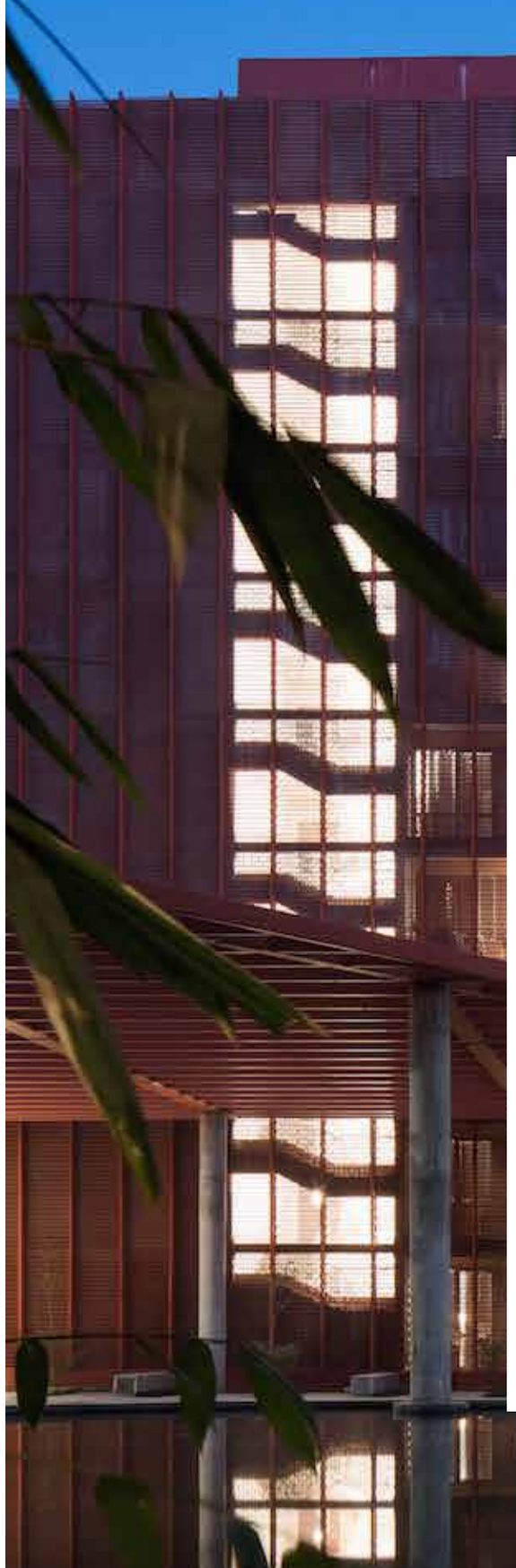
**2019**
*Received NAAC A+ accreditation*

**2020**
*Ranked 156 in Times Higher Education Asia Ranking*

156

**2021**
*Ranked #1 private university in India by Times Higher Education World University Rankings*

#1



## THAPAR INSTITUTE OF ENGINEERING & TECHNOLOGY

Thapar Institute of Engineering & Technology (TIET) was established in 1956 as a collaboration between the then state of Patiala and East Punjab States Union (PEPSU), the central Government and the Patiala Technical Education Ttrust (PTET).

Thapar Institute of Engineering and Technology currently ranks as one of the top private universities in India.

Thapar Institute of Engineering & Technology (TIET) brings to the world 63 years of excellence teaching and research. The Institute is in Patiala & spread over a 250-acre campus with modern infrastructure and beautiful gardens. The Institute has grown and evolved during the last six decades of its existence. Nearly 18,500 engineers have left its portals so far, distinguishing themselves as proud Thaparians in diverse fields across India and the globe, In recognition of the contribution of the Institute towards engineering and science education, TIET was granted full autonomy and the status of a Deemed to be University in 1985 by UGC.

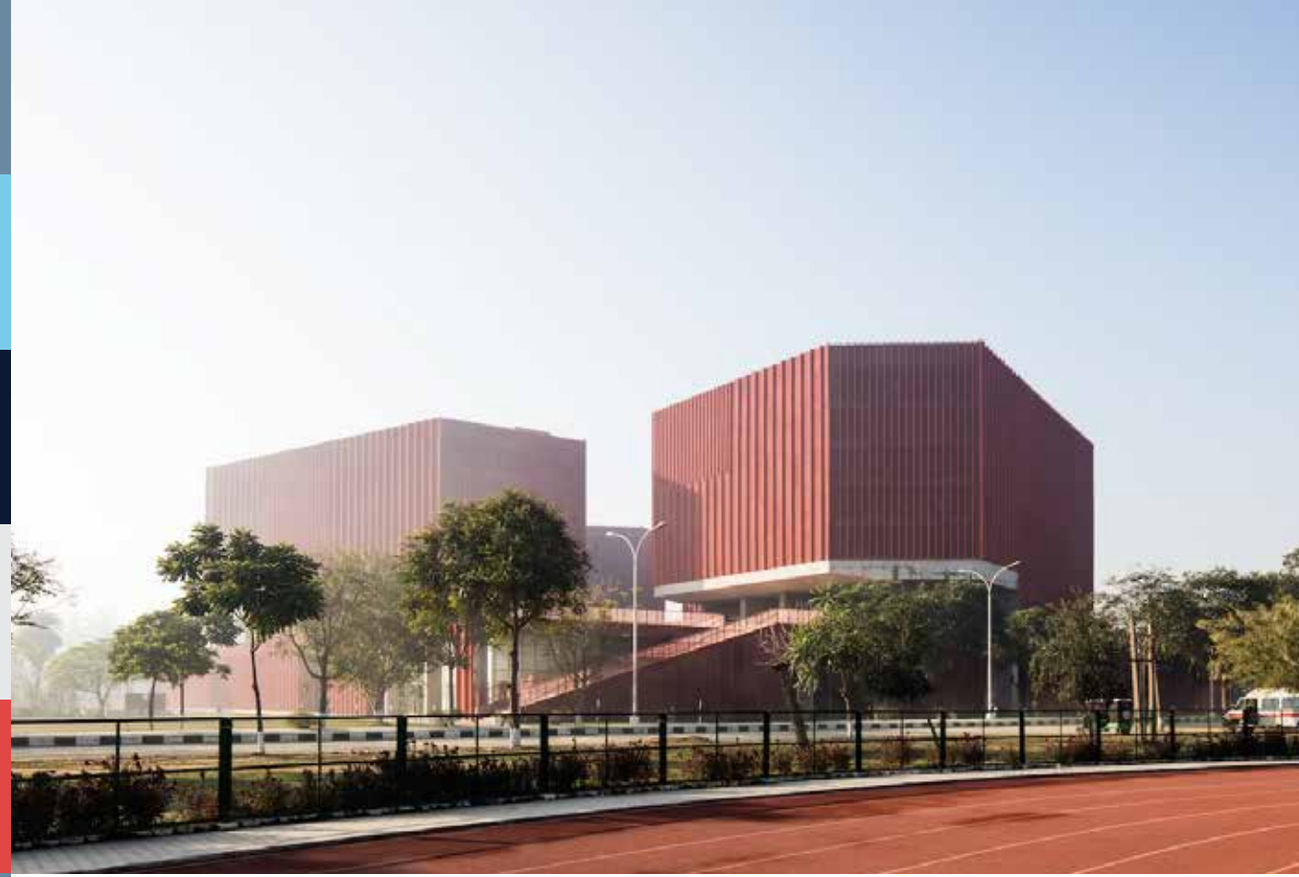
## SCHOOL OF CHEMISTRY & BIOCHEMISTRY

# *Vision*

To be recognized as the school of excellence in higher education, research and innovation in the areas of chemical sciences and to remain sensitive and responsive to changing needs of the society.

# *Mission*

- To create, develop and disseminate new knowledge in chemical sciences.
- To provide post-graduate education in the areas of chemical sciences and support undergraduate and other educational programs.
- To remain active in frontier areas of chemical research of international standard and relevant to Indian industry and society.
- To provide state-of-art infrastructure and conducive environment for faculty and students to produce globally competent professionals.



School of Chemistry and Biochemistry (DST-FIST sponsored) initiated its journey as an independent school in 2002 to endorse teaching and research in the Chemistry. In order to promote the interdisciplinary research in chemical and biological sciences another area Biochemistry was introduced in 2015.

Our school has extremely capable and ever enthusiastic faculty members having research experiences from recognized institutes in either India as well as abroad. The broad research interests of our faculty members are Organic Synthesis and Medicinal Chemistry, Chemical Sensing and Environmental Chemistry, Chemical Biology, Catalysis and Nanochemistry, Computational Chemistry etc. The research laboratories are well-equipped with specialized instruments (eg, TGA, GC, GC-MS, HPLC, Fluorimeter, FTIR, UV-Vis, NMR, etc.).

As one of the most research active department, school of chemistry and biochemistry is currently providing an ideal blend of strong theoretical knowledge and research skills. The futuristic curriculum is designed to enable students to rationalize and solve different types of scientific and socially relevant problems.

# *Academic Programs and Courses*

## *Academic Programs*

The school offers academic programs both at postgraduate and Ph.D. levels.  M.Sc - Chemistry has been offered since 2007 while M.Sc - Biochemistry started in 2015. Both the postgraduate programs are supported by excellent infrastructure, experienced and qualified faculty, and TIET's placement cell.

### M.Sc – CHEMISTRY

After completing this program, students can opt for a doctoral degree either in India or abroad. They can also join as faculty in the colleges or coaching institutes besides joining the chemical and IPR industry.

M.Sc-Chemistry is a two-year (four-semester) program designed to strengthen fundamental concepts of chemistry besides focussing on demands of the industry. There is equal stress on both theory and practice that involve state of art techniques like NMR, XRD, SEM, etc. The curriculum, revised periodically, employs advanced and most recent pedagogical approaches like student-centric learning, research-based teaching, and experiential learning.

The project in the final semester in any of the research labs of TIET and six to eight weeks of summer training at the end of 1st year are the unique features of this program. This gives our students an edge in terms of hands-on experience with advanced instruments, awareness of contemporary research topics, literature surveys, thesis writing, and presentation skills.

Many of our alumni after doing M.Sc-Chemistry are doing/completed  Ph.D. from the reputed institutes of India ( IITs, IISERs, INST or RCB ) and abroad ( USA, Germany, Canada, Ireland). TIETs placement cell has helped place our students in reputed industries like Agilent Technologies, Sun Pharma, IOCL, and coaching institutes like Aakash, Lakshya with attractive packages.

### M.Sc - BIOCHEMISTRY

The extensive training provided in the M.Sc - Biochemistry makes our students employable in various sectors like careers in biochemical pharmacological, toxicological research and jobs in agriculture, food processing, healthcare, and IPR industry.

This research-based two-year (four-semester) program, includes regular biochemistry courses besides preparing students for interdisciplinary topics

The unique features of this program involve dissertation work for a semester, eight weeks of summer training in academia or industry, and imparting thesis writing and literature survey and presentation skills. This also gives our students an opportunity to publish research articles (papers) in leading international journals and conferences.

Most of our alumni are either doing Ph.D. from India (IIT, IISER, TIET, PAU) or abroad.  Many have been placed in various industries like Sun Pharma, Reckitt, Baxter, Parexel, and coaching institutes like Fiitjee, Lakshya, Akash with attractive packages.

### Ph. D. PROGRAM

Currently, our school is also offering a high-quality doctoral program in different areas: Analytical Chemistry, Organic Chemistry, Organometallic Chemistry, Environmental Chemistry, Medicinal Chemistry, Inorganic Chemistry, Nano Chemistry, Nano-Materials and Bio-physical Chemistry. Our school is one of the most productive departments in the TIET in terms of research publications in peer-reviewed, SCI journals, setting up national and international collaborations as well as receiving many competitive, high-budget research grants. Accordingly, our teaching and research laboratories are well-equipped whereby the research labs are equipped with specialized instruments (viz., TGA, GC, GC-MS, HPLC, Fluorimeter, FTIR, UV-Vis, NMR, etc.). Our students enjoy extensive research training during this program which allows them to gain key skills that act as a gateway to their future. Our research scholars have many of our Ph.D. students who had received postdoctoral offers from several institutes abroad and a few of them are placed well in academics as well as industries. They have also received several prestigious fellowships and awards (Marie Currie post-doctoral Fellowship, DST Women Scientist Award, SERB National post-doctoral Fellowship, UGC-MANF, etc.).

# *UG Courses*

The school offers chemistry courses to all engineering undergraduates as per the requirement of their specialization. The courses cover advanced fundamentals of general and applied chemistry. Following courses are taught.

## APPLIED CHEMISTRY

The course offered to all the 1st year engineering students impart an understanding of the principles and theories of chemistry to solve a real-world problem. It includes basic concepts of spectroscopy, water treatment and analysis, conventional fuels and polymers, their green alternatives,  electrochemistry along other related lab experiments. Students are expected to apply the concepts learned in this course through problem-solving and illustrations.

## GENERAL CHEMISTRY I & II

The course offered in the first two semesters of biomedical engineering has been designed in collaboration with the University of Toledo, USA. It helps students prepare the concepts of chemistry experimentation and measurements with a strong emphasis on analytical skills. It covers the physical and chemical properties of atoms, ions, and molecules and their relationship with different phase transformations followed by kinetic and thermodynamic properties. Students are expected to rationalize their fundamental learning concepts in this course by various problem-solving assessments.

## BIOENGINEERING THERMODYNAMICS

The course developed in collaboration with the University of Toledo, USA  is offered to the 2nd-year biomedical engineering students of TIET. The course equips the students with fundamentals of thermodynamics that will enable them to understand and apply the laws of thermodynamics to the biological systems, comprehend the principles of chemical and physical equilibria as well as interpret the salient features of chemical and enzyme catalysis. Students are expected to deduce the processes in various systems by applying the principles of thermodynamics through problem-solving approaches.

# *Major Research Areas*

**Catalysis and Nanochemistry**

**Organic Synthesis and Medicinal Chemistry**

**Chemical Biology and Biophysical Chemistry**

**Computantional Chemistry**

**Chemical Sensing and Environmental Chemistry**

## ONGOING SPONSORED PROJECTS

- Short and efficient synthesis of natural fragrance and pheromones employing organocatalyzed aldol reaction
- Magnetic core supported heterogeneous catalysts for the glycerol carbonate synthesis
- Ruthenium Catalyzed C-H Band Activation Strategy For C-C And C-X Bond Formation For Biological Active Compounds
- Dynamic Combinatorial Chemistry: Accessing complex topologies and new receptors
- Design and Synthesis of Tri/tetraphenylethylenederivatives as fluorescent receptors and anticancer agents
- A fluorometric bimodal nanosensor based on carbon dot-MnO2 nanocomposites for detection and intracellular imaging of glutathione.
- Encapsulation of Mesoporous Carbohydrate Nanoparticles on Intestinal Microflora Cell Surface for Enhancement of Drug Effectiveness.

# *Alumni Success Stories*

*Dr. Amit Mishra*
**Ph. D 2018**
Recipient of Prestigious Marie-Currie Post-Doctoral Fellowship

*Prachi Sharma*
**M. Sc. Chemistry 2018**
Research Scholar in Martin Luther University Halle, Germany

*Shagun Goyal*
**M. Sc. Chemistry 2019**
Qualified CSIR-JRF with All India Rank 64

*Himanshi Pahuja*
**M. Sc. Chemistry 2019**
Research Scientist, Sun Pharmaceutical Industries Limited, Gurgaon

*Dr. Shweta Sareen*
**Ph. D**
Recipient of Prestigious SERB-National Post-Doctoral Fellowship (NPDF)

*Dr. Yuvraj Garg*
**Ph. D 2017**
Post-Doctoral Fellow in Okinawa Institute of Science & Technology, Japan

*Nidhi Arora*
**M. Sc. Chemistry 2017**
Research Scholar in Trinity College Dublin, Ireland

*Disha Kapila*
**M. Sc. Biochemistry 2019**
R&D Assistant in Reckitt Benckiser

*Hardeep Kaur*
**M. Sc. Biochemistry 2019**
Teacher, Akash Institute

# *Faculty Achievements*

**Dr Vikas Tyagi : "ISCB Young Scientist Award"** in Chemical Sciences during 26th ISCB International Conference on Integrating Chemical, Biological and Pharmaceutical Sciences for Innovation in Healthcare (ISCBC-2020), Nirma University Ahmedabad.

**Prof. Susheel Mittal:** Member, Advisory Board, Analytical Methods (Royal Society of Chemistry, UK)

**Prof. Susheel Mittal:**
Chartered Chemist by Royal Society of Chemistry (UK) (2017)

**Prof. Manmohan Chhibber:**
Thapar Trinity Teaching Fellow (TTTF-2020)

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