Biological Science & Bioengineering
Indian Institute of Technology, Kanpur

Placement Brochure 2019-2020
The department is engaged in cutting-edge research and training in basic biology, biomedical and bioengineering fields. Its aim is to produce quality professionals in modern biology and allied fields who will engage in addressing country’s challenges by advancing the discovery in biology. Our faculty and students come from a range of science and engineering disciplines and work in challenging problems that transcend the boundaries of science, engineering and medicine.

The department currently offers four academic programs; B. Tech, B.Tech-M.Tech Dual, M. Tech and PhD in biological sciences & bioengineering. There are 16 faculty members and about 100 postgraduate (75 PhD. and 25 M. Tech.) and 145 undergraduate students.

For more info please visit department website: http://www.iitk.ac.in/bsbe/
## Students

**Undergraduate Program B.Tech, B.Tech-M.Tech Dual**: Admission to the B. Tech program is through the joint entrance examination (JEE) conducted by the IITs. The curriculum aims to expose students to exciting new fields of knowledge while also providing opportunities for obtaining valuable hands-on research experience. The program provides a unique fusion of biology with other basic and engineering sciences. Undergraduate students compete for scholarships and R&D internship in Biotech/Biopharma industries under the auspices of endowment funds established by IITK alumni.

**M. Tech (2 years)**: M. Tech program supported by Department of Biotechnology (DBT), Govt. of India meets a variety of career objectives in research and industry. The program is for four semesters of which three semesters involve hands-on training and research. Admission to M.Tech program is through GATE exam conducted by IITs followed by department written test and interviews.

**Doctor of Philosophy (PhD)**: Excellence in research apart, the program envisages comprehensive development of students for leadership in science and engineering in both industry and academia. Therefore, the PhD program involves intense course work covering diverse areas of biology and bioengineering for competence in both analytical and quantitative skills.
Curriculum

B. TECH AND B. TECH – M. TECH DUAL

1st year Basic Sciences
2nd year Engineering Sciences and projects
3rd year Compulsory topics, electives and Summer Internships, Undergraduate Project in a Professors Laboratory
4th year (and 5th year for Dual)
    Compulsory topics, electives and Thesis

M. TECH

1st Semester- Department course
2nd-4th Semester- Department seminar and Thesis research work

PhD

1st year- Advanced courses
2nd year- Comprehensive and State-of-art exam
3rd year onwards- Thesis research work

ELECTIVES

Electives in the department include a total of 7 open electives in which students take up courses from other departments of Computer Science, Economics, Chemistry, Industrial Management etc.
Electives also include 3 departmental electives taken from courses in the department itself.
For list of courses available as electives click here.
Courses

UG ENGINEERING COURSES
- Engineering Physics
- Engineering Mathematics
- Chemistry
- ‘C’ Programming
- Nature and Properties of materials
- Introduction to electronics
- Engineering graphics
- Manufacturing Processes
- Probability and statistics
- Computational methods
- Data Structures and Algorithm

UG LABORATORY COURSES
- Biochemistry and Biochemical engineering
- Biomechanics and Biomaterials
- Structural Biology and Bioinformatics
- Microbiology and molecular biology

BSBE DEPARTMENT COURSES
- Biopharmaceuticals
- Biochemistry & Structural biology
- Biochemical engineering
- Bioinformatics and Computational biology
- Bioelectricity
- Protein structure & engineering
- Biomaterials
- Tissue engineering
- Biomechanics
- Human molecular genetics
- Functional genomics
- Cell and Molecular biology
- Immunology and Neurobiology
- Developmental Biology
- Physiology
- Instrument methods
- Professional & Scientific communication
Research

The faculty members are engaged in multi-disciplinary research on cutting-edge problems. Ongoing research projects are spread in broadly three major domains that include (a) molecular, cellular and developmental biology, (b) structural and computational biology and (c) bioengineering. A major emphasis is on understanding the fundamental aspects of cell differentiation and growth, regenerative medicine, elucidating protein structure-function relationship, and engineering approaches to understand complex biological systems.

The department has attracted funding from major national and international agencies including the Wellcome-DBT India Alliance, Indo-UK Science bridge program, UKERI, DBT, DST, CSIR, DAE, ICMR and DRDO to name a few.
Infrastructure & Research facilities

**UG/PG Teaching Labs:**
Microscopes, centrifuges, laminar hood, incubators, gel doc system, fermenter, electrophoresis apparatus etc.) for conducting lab courses (microbiology, molecular biology, biochemistry, biochemical engineering and biomaterials) for the undergraduate students (about 100/year).

**Core facilities:**
Basic facility include Ultra centrifuges, large volume centrifuges, shaker incubators, confocal and fluorescence microscopes, gel doc systems, water purifier, autoclaves, cold rooms, deep freezers.

**Bioinformatics facility:** Servers, Workstations and software modules for high performance computing

**Material characterization facility:** Scanning Electron Microscopy, Rheometer, Fabrication facility, Dynamic light scattering

**Tissue culture and histopathology facility:** culture rooms for cell, organ and virus cultures, tissue processing unit, microtome and cryostat

**Genomic facility:** Affymetrix Microarray facility, DNA Sequencer, Real-time PCR

**Protein purification and characterization facility:** X-ray crystallography facility, scintillation counter, phospho-imager, Circular Dichroism, Fourier Transform Infrared Spectroscopy, High Performance Liquid chromatography, Fast protein liquid chromatography

**Transgenesis Facility:** Transgenic facility for mouse, chicken, Drosophila, C. elegans and zebra fish

**Cell sorting and imaging facility:** Cell sorter, Laser Scanning Confocal Microscope, Live-Imaging equipped Microscope, Fluorescence microscope
## Internships and Past Recruitments

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