DEPARTMENT OF BIOLOGICAL SCIENCE AND BIOENGINEERING

Indian Institute of Technology Kanpur

CONTACTS

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Students' Placement Office website : www.iitk.ac.in/spo

Indian Institute of Technology Kanpur carries out original research of significance and technology development at the cutting edge. It imparts training for students to make them competent, motivated engineers and scientists. The Institute not only celebrates freedom of thought, cultivates vision and encourages growth, but also inculcates human values and concern for the environment and the society

The Department of Biological Sciences and Bioengineering (BSBE) was established with the aim of providing a multidisciplinary research and teaching program in modern Biology and Bioengineering. The Department offers both undergraduate (B.Tech) and post-graduate degrees (M.Tech and PhD). The Departmental curriculum focuses on teaching various aspects of biotechnology and bioengineering which are industry as well as research oriented. These include tissue engineering, biomaterials, drug delivery, bioprocess engineering, biomechanics, bioinformatics, bioremediation, structural and computational biology, bioelectricity, biopharmaceuticals, cell & molecular biology, genetics and developmental biology. The department has developed extensive research facilities and infrastructure to support teaching and research activities.

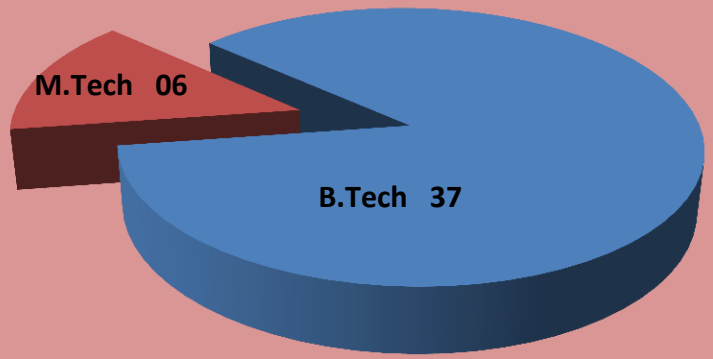
In a short span of time this department has accomplished in training students such that they can be assets to both the industries and various research institutions.

For more info on the Department please visit:
www.iitk.ac.in/bsbe

Academic Programs

Undergraduate Program B.Tech	Postgraduate Program M.Tech	Postgraduate Program Ph.D.
Admission for B.Tech programs is through IIT-JEE, which is one of the most competitive and prestigious exams in the world at the undergraduate level. Only the top 1 percentile of the students appearing for the exam gain admittance to this program. Eight semesters of comprehensive theoretical coursework exposes students to various aspects of basic sciences and engineering. The four year Undergraduate curriculum aims to expose students to the advancements in Industries along with hands on experience on the latest experimentation techniques with state of the art Laboratory exposure.	M.Tech and Ph.D. admission are through highly competitive exam as GATE, JRF of UGC, CSIR, DBT, ICAR or ICMR conducted jointly by IITs and IISc. This is followed by a rigorous departmental written exam and interview process. The program is also supported by the Department of Biotechnology (DBT), Gov. of India. The program is for four semesters of which the last two semesters involve hands-on training and research. Students from diverse backgrounds of engineering, pharmacy, biotechnology, medicine and life sciences involve both course work and Intensive lab work for four semester program which train students for work in research labs and industries.	Ph.D. program in BSBE is intended for students interested in carrying out distinguished scholarly activities. Excellence in research apart, the program envisages comprehensive development of students for leadership in science and engineering in both industry and academia. Therefore, the Ph.D. program involves intense course work covering diverse areas of biology and bioengineering for competence in both in analytical and quantitative skills. Each student joins a lab for their thesis which spans a period of 1 year and a half for M.Tech to 4-5 years for a PhD Students present their work as part of extensively distributed seminars, journal clubs and examinations.

Graduating Batch 2014



Faculty

Prof. R. Sankararamakrishnan (Head of the Department)
Doctorate: Indian Institute of Science, Bangalore
Post Doctorate: Oxford University
Research Interests: Bioinformatics & Bimolecular Simulations

Prof. S.Ganesh
Doctorate: Banaras Hindu University
Post Doctorate: Indian Institute of Science
Research Interests: Molecular genetics of neurological disorders.

Prof. Pradip Sinha
Doctorate: Banaras Hindu University
Post Doctorate: German Cancer Research Center, Heidelberg
Research Interests: Cancer Genetics and Genomics

Prof. K Subramaniam
Doctorate: Indian Institute of Science, Bangalore
Post Doctorate: Johns Hopkins University
Research Interests: Development of germ & functional genomics.

Prof. Amitabha Bandyopadhyaya
Doctorate: Albert Einstein College of Medicine
Post Doctorate: Harvard Medical School
Research Interests: Mechanisms of Cartilage and bone differentiation

Prof. Jonaki Sen
Doctorate: Albert Einstein College of Medicine
Post Doctorate: Harvard Medical School
Research Interests: Pattern formation in developing nervous system

Prof. Balaji Prakash
Doctorate: Indian Institute of Science, Bangalore
Post Doctorate: Max-Planck Institute, Dortmund, Germany
Research Interests: Structural and Computational Biology

Prof. Ashok Kumar
Doctorate: IIT Roorkee
Post Doctorate: Lund University
Research Interests: Bioprocess Engineering &Biomaterials.

Prof. Dhirendra S. Katti
Doctorate: University of Mumbai
Post Doctorate: Drexel University, USA
Research Interests: Tissue Engineering and Drug Delivery.

Prof. Ashwani Kumar Thakur
Doctorate: Institute of Microbial Technology, Chandigarh
Post Doctorate: University of Tennessee Medical Center and Pittsburgh Medical School
Research Interests: Protein Sciences and Engineering

Prof. Mainak Das
Doctorate: University of Central Florida (USA)
Research Interests: bio-MEMS,bio-nanotechnology, bio-electronics

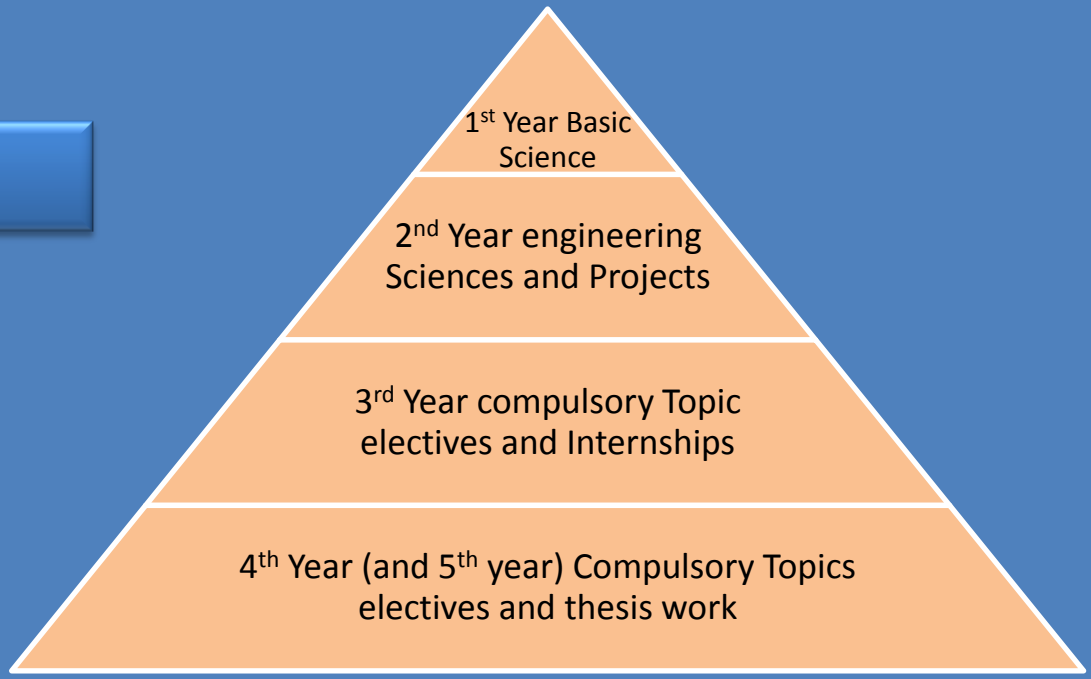
Prof. Bushra Ateeq
Doctorate: Aligarh Muslim University, Aligarh
Post Doctorate:McGill University, Montreal
Research Interest: Molecular oncology and cancer therapeutics

Dr. Jamuna R. Subramaniam
Doctorate: Georgetown University, USA
Post Doctorate: Johns Hopkins University
Research Interests: Biomechanics & Biomedical Engineering.

Dr. Arati Mishra
Doctorate: Banaras Hindu University (Varanasi)
Post Doctorate: German Cancer Research Center, Hiedelberg
Research Interests: Genetics & Developmental Biology

Prof. Saravanan Matheshwaran
Doctorate: The Indian Institute of Science (IISc), Bangalore
Post Doctorate: London Research Institute, UK, the European Molecular Biology Laboratory, Germany
Research Interests: Dynamics of chromatin recognition and remodeling

Course Structure



Relevant Courses

The Major Undergraduate Courses Offered In The Department Are:

CORE SUBJECT

- Biochemical Engineering & Bio nanotechnology
- Bioinformatics & Computational Biology
- Biopharmaceuticals
- Bioelectricity & Bioelectronics Devices
- Biochemistry
- Structural Biology & Biophysics
- Protein Structure & Engineering
- Biomaterials
- Tissue Engineering
- Biomechanics
- Human Molecular Genetics
- Functional Genomics
- Cell & Molecular Biology
- Immunology
- Neurobiology
- Developmental Biology
- Physiology

ENGINEERING COURSES

- Engineering Physics
- Engineering Mathematics
- Chemistry
- 'C' Programming
- Nature and Properties of Materials
- Introduction to Electronics
- Engineering Graphics
- Manufacturing Processes
- Thermodynamics
- Micro scale Thermal Sciences

ELECTIVES COURSES

- Microeconomics
- Macroeconomics
- International Economics
- Probability and statistics
- Computational Methods for Engineers
- Financial Economics
- Data Structures and Algorithms
- Cognitive Science
- Fluid Mechanics and Rate Processes
- Introduction to Game Theory
- Data Mining

LABORATORY COURSES

- Biochemistry & Biochemical Engineering
- Biomechanics and Biomaterials
- Structural Biology & Bioinformatics
- Microbiology & Molecular Biology
- B.Tech Project / M.Tech or PhD Thesis

Facilities

As a complete and self-sufficient department BSBE has several facilities in cutting edge technology. Also the department is supported by instruments in central facilities. For their projects, Students have used one or more of the available Instruments. These include :

- Affymetrix Microarray facility
- Laser Scanning Confocal Microscope
- Automated DNA Sequencer
- Peptide Synthesizer
- Spectropolarimeter
- Fast protein liquid chromatography -
- High-performance liquid chromatograph
- Liquid Scintillation Counter
- Circular Dichroism
- Trans genesis Facility
- SGI Fuel Workstation
- Compaq Alpha server
- Mercury Porosimeter
- Atomic Force Microscopy
- Scanning Electron Microscopy
- Transmission Electron Microscopy
- X-Ray Diffractometer
- Ultracentrifuges

During Lab courses or B.Tech Projects, every UG student gets to learn about almost all these instruments & facilities

Current Research Projects

- Structural Biology of HAS-GTPases
- Circularly Permuted GTPases
- Structural and Biochemical investigations to determine the roles of eukaryotic-like serine/threonine protein kinases (STPKs) inM. Tuberculosis
- Molecular Pathology of Lafora disease
- Molecular pathology of disorders caused by the expansion of amino acid repeats
- Genetic determinants of complex disorders
- Understanding Plant-Nematode Interactions using RNAi

Major Academic Projects

Summer Projects: These are done by students during the 3 months summer holidays, from May to July. This involves projects of various clubs at IIT Kanpur, like aero-modeling, programming, robotics and astronomy club. These expose students to practical lab work and analysis of real systems. Students can personally approach professors and associate themselves with ongoing projects and research stuffs.

B.Tech Projects: This project is undertaken for the last 2 semesters in the undergraduate curriculum and is supposed to be the culmination of the efforts at understanding of engineering concepts and their application to real life problems.

M.Tech Thesis: This project is basically meant for the introduction of research and analytical work in specialized field in mechanical engineering, like solid mechanics, design, fluid and thermal science, manufacturing, robotics, optimization, etc., at the end of which the student comes out with an innovative and meticulous body of research work that he/she has done over a year.

BRaIN

Biological Research and Innovation Network (BRaIN) is a group of students working towards solutions of biomedical problems with a fresh perspective. The aim is to create a bridge between Biology and Engineering
Projects undertaken:

- Circuit of an electroencephalogram ,used on mice
- Programmed the code for detection of eye blink using an Emotive headset
- Genetic tools like MARCM and GAL 4-UAS system to study mutant flies
- Simulated an ecosystem with three species
- Coding of pedigree analysis
- Statistical study of karyotypes for clinical purposes

Funding Agencies:

Department is funded by many agencies to help in completing research projects name of few agencies are :

- Welcome Trust International Senior Research Fellowship award (2004-2009)
- Dept. of Biotechnology (DBT), India (2006-2009)
- R&D Grant from Ministry of Human Resource and Development, India (2004-2007)
- Young Scientist's Start-up Grant from Department of Science and Technology , India (2003)

CAMPUS LIFE

There is a lot more to IIT Kanpur than one of the best facilities and infrastructure for study and research. Numerous activities and opportunities are available that complement academic pursuits and provide opportunities for students to grow and develop new interests and lifelong hobbies.

There is a widespread plethora of clubs, societies and hobby groups under the Students' Gymkhana- where students participate in international robotics competitions, work as a radio jockey at the in-house FM radio station, go on a cycling expedition to the Himalayas and also volunteer to teach less privileged children. The diverse spectrum of clubs- ranging from Literary Societies, Astronomy, Aero Modeling, Dramatics, Music, Dance, Animation, Robotics, a Gliding School and a lot more will be sure to keep you busy and offer enough opportunities for learning and exploring your interests.

Below is name of all clubs and societies of students gymkhana in which students participate during their stay in IIT Kanpur

Students' Gymkhana

Presidential Council

- Gymkhana Lectures and Discussion Club
- Prayas
- Vivekanand Samiti
- Students' Placement Office
- Entrepreneurship Cell
- Book Club

Cultural Coucil

- Music Club
- Dance Club
- Dramatics Club
- English Literary Society(ELS)
- Hindi Sahitya Sabha(HSS)
- Fine Arts Club
- Quiz Club
- SPIC MACAY

Games Council

- Captains
- Chess Club
- Taekwondo Club
- Adventure Sports Club
- Inter-IIT Sports Meet

Film and Media Council

- Campus Magazine
- Photography Club
- Animation Club
- La Montage Club
- Regional Movies Club
- CD Club
- STV Club

Science and Technology Council

- Electronics Club
- Robotics Club
- Astronomy Club
- Aero modeling Club
- Programming Club
- Gliding Club
- HAM Club
- Business Club
- NERD(Notes On Engineering Research And Development)
- Science Coffeehouse

To know more about student activities please visit: http://students.iitk.ac.in/gymkhana/

Student Activities

In addition to academic excellence, the Institute promotes overall development of its students by providing them with ample opportunities to pursue several extra-curricular activities. In addition to activities of several clubs like the Electronics, Robotics, Business Club, the students organize and participate in three major campus festivals:. These four day long festivals, attract participants from more than 200 colleges of India and also foreign participants for few competitions.

ANTARAGNI (IIT Kanpur's annual cultural festival):
It is one of the biggest student organized cultural festivals in India. The festival offers the students a plethora of contests to participate and excel in. Its a four day long festival, attracting participation from over 200 colleges of India. The festival has also served as a platform for the expression of youth opinion, spreading awareness of the pertinent social problems In the recent years.

TECHKRITI (IIT Kanpur's annual technical and entrepreneurship festival):
Techkriti was launched in 1995 with the aim of developing interest and encouraging innovation in technology among students. In seventeen years of its existence, Techkriti has evolved and grown, fulfilling its purpose and becoming one of the most eagerly-awaited college technical festivals in Asia. Amongst the biggest and most competitive technical festivals in the country, it provides a national level platform for the students to showcase their technical expertise and ingenuity. Witnessing lectures by Nobel laureates, the festival provides the students a unique opportunity to interact with academic legends. Having won the prestigious Bio-Business Plan Competition over the last two years, BSBE students have made their mark on the festival.

UDGHOSH (IIT Kanpur's annual sports festival):
To sustain and revitalize the energy and spirit inherent in the students, Udghosh is a depiction of sporting fervor. The festival witnesses participation of students from numerous institutes all over the country.

INTERNSHIPS

Undergraduate students undertake summer internships after the 4th and /or 6th semester. This provides them with an opportunity to gain hands – on experience and also sensitizes them to current areas of research and industry needs.

ACADEMIC INTERNSHIPS(just few**)**

- Massachusetts Institute of Technology
- Caltech
- University of British Columbia
- Whitehead Institute
- University of Wisconsin-Madison
- Johns Hopkins University
- National University of Singapore
- NCBS
- University of Tokyo
- IISc., Bangalore
- University of Tennessee
- University of Amsterdam
- National Center of Neurology and Psychiatry, Tokyo

INDUSTRIAL INTERNSHIPS (just few)

- Dr. Reddy's
- Ranbaxy
- BIOCOS
- Reliance Life Sciences
- Deutsche Bank
- YES Bank-Life Sciences Knowledge Banking
- Grass Roots Research & Creation India Pvt. Ltd.
- Siemens Healthcare

FEW PAST RECRUITERS

Goldman Sachs
Deutsche Bank
BCG The Boston Consulting Group
Biocon
Deloitte.
Dr. Reddy's
flipkart.com
Novartis
EXL
TATA Consultancy Services
eGain Trusted by Leaders
HSBC
Fractal
Philips
Global analytics
headstrong a GENPACT Company
stryker
i3 Consulting Inspiring Innovative Ideas
analytics quotient
Lovely Professional University Transforming Education Transforming India
EVALUESERVE Your Global Knowledge Partner