PLAKSHA UNIVERSITY

Biological Systems Engineering

Want to tackle some of the biggest challenges facing our planet?
The Biological Systems Engineering (BSE) major at Plaksha exposes students to life processes across multiple scales along with engineering principles for building systems level solutions, providing them knowledge and skills to enhance healthcare, agriculture and environmental ecosystems.

A new approach to **innovation**

The BSE major at Plaksha is unlike other biotech or biomedical engineering programs. It incorporates more elements of modern computational tools like machine learning, artificial intelligence and data science, when studying and designing solutions for biology.

Courses in the BSE major are designed to equip learners with knowledge and skills required to understand individual components of biological systems, and investigate the behavior of complex living systems.

Are you passionate to create impactful solutions to tackle 21st century challenges in healthcare, agriculture and environmental ecosystems using biology and modern computational tools? The BSE program at Plaksha will be the right fit for you.

Admissions process

Plaksha University's holistic admissions process is intended to identify exceptional, curious students who demonstrate strong academic rigor and excel in co-curricular and extra-curricular activities.

The process includes an online application, interaction with admissions team and a technical interview.

Applicants must have studied either (1) Mathematics or (2) Physics and Biology until Grade 12 to be eligible to apply for the BSE program.

Please scan the QR code to learn more about the admissions policy.

Faculty behind BSE

Faculty at Plaksha are equally brilliant as teachers, researchers and practitioners. They have trained and worked at some of the world's best universities.

Faculty with primarily affiliation with the BSE track bring seasoned expertise in biological systems and in developing solutions that can have a tangible impact on society.

Dr. Monika Sharma

Associate Professor
PhD – Computational Natural Sciences
IIIT Hyderabad

Dr. Monika Sharma is the Program Chair of the BSE program. Her expertise lies in Bioinformatics, Computational Biophysics and drug design.

Dr. Arshdeep Sidhu

Assistant Professor
PhD – Nanophysics, ***University of Twente***

Dr. Arshdeep Sidhu studies proteins in the context of developing systems to guide clinical decision making for diseases, such as cancer and neurodegeneration.

Dr. Chaitanya L Indira

Associate Professor
PhD – Materials Science, ***IISc Bengaluru***

Dr. Chaitanya Lekshmi Indira is the Director of Center for Equitable & Personalized Healthcare at Plaksha, with expertise in nanostructured materials, electrochemical and optical sensors.

Dr. Navjot Kaur

Assistant Professor
PhD – Chemical Engineering, ***IISc Bengaluru***

Dr. Navjot Kaur is an experienced molecular diagnostician and microbiologist. Her research focuses on understanding and utilizing fungal microbes and microbiomes to address crop diseases and improve soil health.

Dr. Prashanth S Kumar

Assistant Professor
PhD – Environmental Biotechnology
Delft University of Technology

Dr. Prashanth Suresh Kumar addressed the globally pressing issue of harmful algal blooms during his PhD research. He explores methods to optimize resource recovery from wastewater.

Dr. Rucha Joshi

Associate Professor
PhD – Biomedical Engineering
Purdue University

Dr. Rucha Joshi has two patents, one of which is on making low calorie biscuits from banana peel pulp. Her current research focuses on natural biomaterials such as silk fibroin and collagen.

Dr. Swagata Halder

Assistant Professor
DPhil – DNA Repair, ***University of Oxford***

Dr. Swagata Halder is pursuing research in DNA damage response to formulate novel therapeutic interventions against cancer. His area of expertise lies in DNA Repair.

Course themes in **BSE**

Foundations of Biological Sciences

This theme emphasizes the core biological principles that form the backbone of the program, integrating traditional sciences with modern applications.

- *Biochemistry & Molecular Biology*
- *Cell Biology*
- *Genetics & Genetic Engineering*
- *Human Physiology*
- *Neurosciences*

Computational and Data-Driven Biology

This theme highlights the integration of computational tools and data science into biological research and engineering.

- *Introductory Bioinformatics*
- *Modeling in Biology*
- *Networks & Systems Biology*
- *Translational Computational Biology*

Bioengineering and Biotechnology

This theme focuses on the application of engineering principles to biological systems, emphasizing innovation in bioprocessing, diagnostics and materials.

- *Material Sciences for Bioengineering, Bioprocess Engineering*
- *Sensing & Actuation, Engineering One Planet (Bioremediation)*
- *Lab-on-a-Chip, Biomedical & Pharmaceutical Polymers*
- *Diagnostic Technologies (Biomedical Imaging & Analysis)*
- *Nucleic Acids & Protein Biosensors*

Interdisciplinary and Emerging Technologies

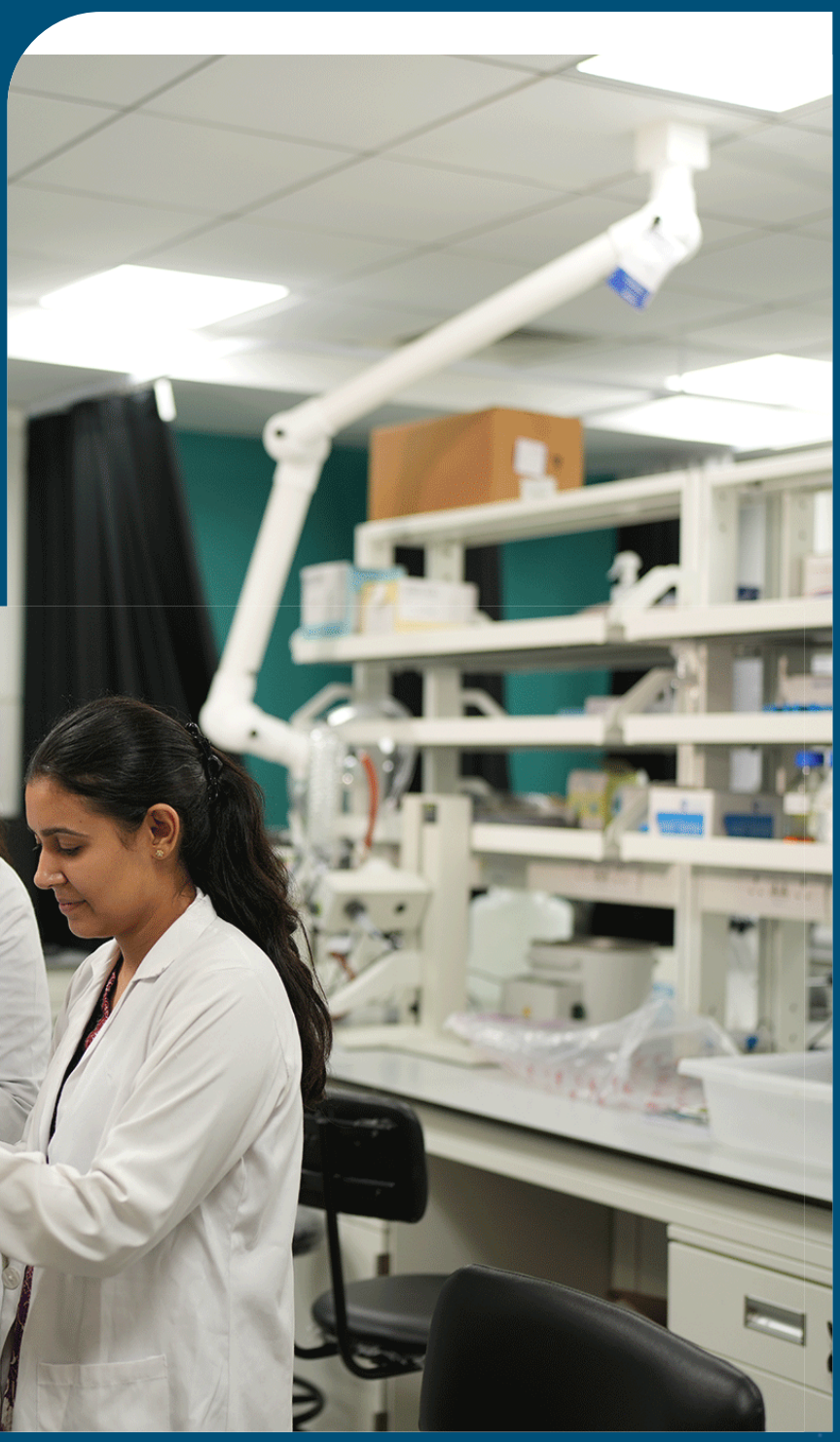
This theme showcases the program's focus on cutting-edge, interdisciplinary areas that combine biology, engineering and computational sciences.

- *Machine Learning & Pattern Recognition, Deep Learning, Reinforcement Learning*
- *Sensing & Actuation, Lab-on-a-Chip*
- *Translational Computational Biology, Nucleic & Protein Biosensors*
- *Personalized Healthcare, Biomedical Imaging & Analysis, Neurosciences*

Sustainability and Global Challenges

This theme highlights the program's focus on addressing global challenges through biological and engineering solutions.

- *Bioprocess Engineering*
- *Engineering One Planet (Bioremediation)*
- *Biomedical & Pharmaceutical Polymers*
- *Personalized Healthcare, Environmental Economics*



BSE students **address grand challenges**

The BSE program at Plaksha fosters a hands-on learning environment where students actively engage in impact-driven projects. Through collaborations with industry, government and academia, they gain insights into practical applications and contribute to cutting-edge research.

Student projects

Micro-fluidics/Paper-based biosensor for sugarcane

Developed a cost-effective paper-based biosensor ($2.50) to measure sucrose content in sugarcane, delivering results comparable to the $2,400 ATAGO polarimeter

Employed GOD-POD biochemistry reaction and Whatman filter paper, with optimizations conducted using UV-Vis spectroscopy readings at 405 nm

Cockroach Biorobot

Dealt with the neurological functions of cockroaches.

Implanted electrodes in the antenna of the cockroach to track the movement, functioning and control of the cockroaches.

Quantitative prediction of Alzheimer's disease

Used a pseudo-homogenous model of the brain to describe Alzheimer's disease as a Turing pattern emerging from a homogenous steady state.

The unsteady PDE model for simultaneous reaction and diffusion of the activator and the inhibitor was formulated and solved.

Student **internships**

Samyucktha Ganesapandian, Class of 2025
Summer Research Intern | Eurofins Advinus Biopharma, Bengaluru

Nainika Gupta, Class of 2025
Research Intern | Cancer Systems Biology Laboratory, IISc Bengaluru

Maanal Gauri, Class of 2025
Behavioral Ecology Lab, IISER Mohali

Vikas Kumar, Class of 2025
Param Hansa Centre for Computational Oncology (PHCCO), IISc Bengaluru

Corporates

- Cadila Pharmaceuticals
- Shell (Bengaluru)
- Indigene Ltd
- Eurofins Adnivus
- Gena HealthX Pvt Ltd

Universities

- IIT Bombay
- Texas A&M University
- National Chung Cheng University Chiayi, Taiwan
- IISc Bengaluru
- Taipei Medical University, Taiwan
- IISER, Mohali,
- IISc Bengaluru
- Plaksha University
- Tsinghua University, Beijing
- University of Hyderabad

Achievements

- 1 student interned at Tsinghua University as part of the prestigious Amgen Scholars Program
- 2 students selected for a computational oncology workshop at IISc, Bengaluru
- 2 students completed summer/semester internships in Taiwan through an international scholarship program
- 2 students currently pursuing semester-long internship at Texas A&M University, USA

Email: apply@plaksha.edu.in

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Scan the
QR code to apply.