B.TECH.

BIOMEDICAL ENGINEERING

AJEENKYA
D Y PATIL UNIVERSITY
THE INNOVATION UNIVERSITY

School of Engineering

ENGINEERING EDUCATION FOR THE 21ST CENTURY

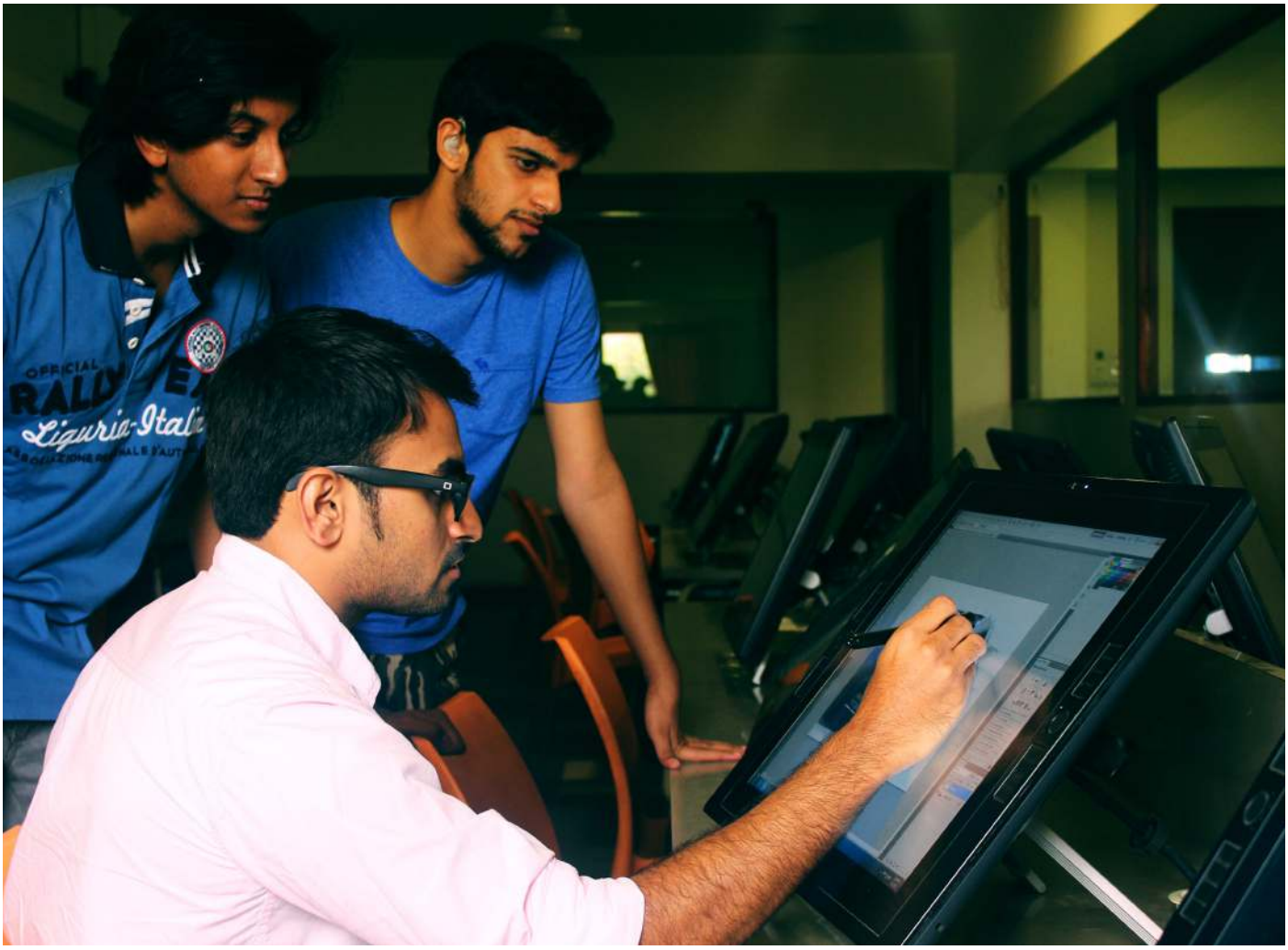
The traditional engineering curriculum offered by multitude of engineering colleges across the country generally falls short of stressing design, quality, system integration, creative thinking and problem solving skills, as well as other analytical and interpersonal skills. The result is that most of the graduating engineers are deemed unemployable.

The School of Engineering has evolved a new engineering education paradigm, characterized by active, project based learning; horizontal and vertical integration of subject matter; introduction of mathematical and scientific concepts in the context of application; close interaction with industry; broad use of information technology; and a faculty devoted to developing emerging professionals as mentors, rather than as all-knowing dispensers of information.

Innoventive engineering is a radical new approach to engineering education that is grounded in

- **Engineering design powered by design thinking,**
- **Focuses on identifying and solving real – world problems for real people and**
- **Aspires to produce entrepreneurs and innovators.**

INNOVENTIVE ENGINEERING



Innoventive Engineering engages engineering students with a real problem, which has no given solution in an industrial / social context, develop social and collaborative skills, introduce new product development methods in a project environment.

This radical approach will enable engineering students to develop products and services around those products that are innovative, useful, safe, aesthetically appropriate, ecologically sound and socially beneficial while serving the needs of society, consumers, manufacturers and the environment.

CURRICULUM

Our curriculum is designed to make our students, Innoventive Engineers. The school of engineering course structure is based on the benchmark specified by Accreditation Board of Engineering & Technology (ABET), USA.

We use Conceive – Design – Implement – Operate (CDIO) approach to define expected outcomes necessary for modern engineering practice.
The CDIO approach meets the needs of students, faculty and industry by collecting and formalizing the knowledge, skills and attributes that student's desire and that industry leaders expect graduating engineers to have. The CDIO approach has been developed by a coalition of Massachusetts Institute of Technology (MIT), Chalmers University of Technology, Royal Institute of Technology (KTH) and Linköping University (LiU).

Following are the outcomes for a student completing the program.

- Engineering Reasoning and Problem Solving
- Personal Skills and Attitudes
- Professional Skills and Attitudes
- Multi-Disciplinary Teamwork
- Communications
- External and Societal Context

Experimentation and Knowledge Discovery	System Thinking Conceiving and Engineering Systems	Designing Implementing	Operating	Enterprise and Business Context
The Researcher	The System Designer	The Device Designer/ Developer	The Product Support / Operations Engineer	The Entrepreneurial Engineer/Manager

Professional engineering career tracks implicitly identified in the CDIO Syllabus

An Innoventive curriculum needs similarly powerful delivery mechanism. We are proud of our distinctive delivery mechanism that engages students and motivates them to aspire for more.

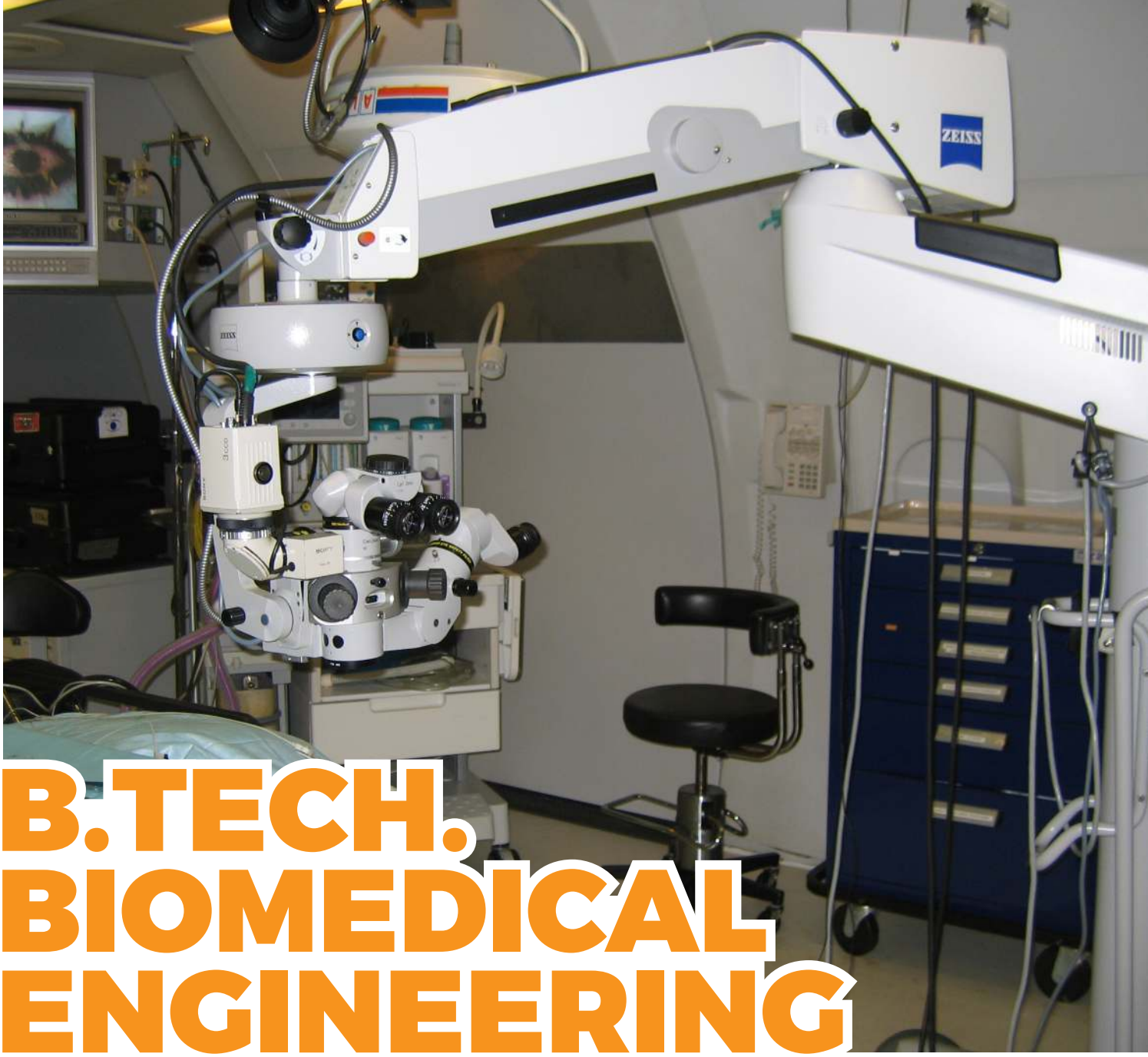
Students get a real world experience while solving interesting problems in the classroom which not only brings dynamism in the classroom, but also instils in them an entrepreneurial spirit right from the early years. Teachers employ problem-based learning where they connect the topic being taught to a real world situation through appropriate cases, simulations and interesting discussions.

While there will be many small projects within the course, that the students will work on, the students start being a part of a major multidisciplinary team project right from the first year. This three year project moves along with subject knowledge and skills acquired by the students in successive years and leads to a major achievement by the end of third year.

TEACHING METHODOLOGY

The Kolb model describes our unique learning experience. The learning activities are structured in a manner that they proceed completely around this cycle, providing the maximum opportunity for full comprehension.

KOLB'S CYCLE



B.TECH. BIOMEDICAL ENGINEERING

It is concerned with the deployment of cutting-edge technologies for prognosis, diagnosis, monitoring and treatment of the sick. It is a newer branch of engineering and is for those students who wish to pursue a career at the cross section of medicine and biology.

Biomedical Engineering is a combined study of biological sciences, engineering and medicine to improve human healthcare.

Bioengineering is where engineering meets medicine. Bioengineers use traditional engineering techniques to find innovative solutions to real world biological and medical problems. Examples of bioengineering include - Kidney dialysis and transplantation, Hip implants, Cardiac stents, Tissue engineering for skin and nerve repair, Medical imaging, such as X-rays, MRI and CT scanners

BIOMEDICAL ENGINEERS

- Create state-of-the-art medical devices such novel imaging and tomography techniques, advanced biosensors and instrumentation as well as robotic solutions and rehabilitation exoskeletons.

- Design, develop and maintain biomedical instrumentation, control systems as well as other devices.

- Work on advanced bioengineering topics such as robot technology, bioimaging, computational vision and more.

- Focus on improving and replacing damaged and diseased body parts such as creation and manufacture of advanced biomaterials and synthetic tissues, tissue regeneration, and the manufacture of new drugs and cell/gene therapies.

- Work to help the medical profession to diagnose and treat diseases, repair or replace damaged living tissue and provide life-support and life-enhancing tools.

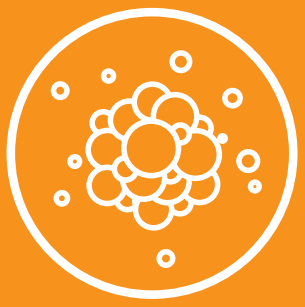
THE PROGRAM

The real study of biomedical engineering begins from second year onwards. You will start with the fundamentals of life sciences where the focus in on mammalian physiology and cell and molecular biology. You'll learn about biology, physiology and the anatomy. Thereafter you will learn engineering basics as applied to biomedical engineering from electronics to tissue engineering to biomechanics, biomedical instrumentation, control systems analysis and design and computational biomedical engineering.

In the first year, you will undergo a common core curriculum for engineering. If you are deficient in Mathematics at your XII'th level, you will be doing an additional basic course in Mathematics.

In the third year, you will undergo an integrated sequence of Biomedical related courses which will carry forward from the knowledge gained at the second year stage. Through your third year you will study advanced biomedical systems and learn about state-of-the-art medical devices. In the final year you will learn advanced bioengineering topics such as design of medical devices, implants, as well as bioimaging. In the final year you will be working on a major team project as a final project chosen by you wherein you will select, formulate, and solve a major design problem.

medical imaging



tissue & cell engineering

medical devices

diagnostics

bioinstrumentation

drug discovery

orthopedics

pharmaceuticals

CAREERS

This is a distinctive program. At the end of the course you will be speaking three languages viz. engineering, medicine and life sciences. This also means that your career options traverse through these three industry and organisational domains. You will find a suitable occupation concerning these three industry verticals such as **medical imaging, medical devices, bioinstrumentation, software, orthopedics, tissue & cell engineering, diagnostics, drug discovery, pharmaceuticals, genomics, bioinformatics and more.** You will find positions in hospitals, pharma companies, medical research institutions, teaching, government, consulting, services, and sales.