

LEAP

Learn Engineering by
Activity with Products

IITM Incubation Cell



Engineering education in India today

India has a very large number of engineering graduates. Indian companies provide engineering design services globally. However, when it comes to product design and innovative solutions to society's problems, India lags far behind.

This is due in large measure to the limited practical exposure of students in the largely theory-oriented UG teaching in most of our

colleges. Many of their teachers do not have industry exposure. Hence, many students do not develop innovative and entrepreneurial mindset. Most of them do not get core engineering jobs, many leave engineering altogether.

Out of about 10 lakh engineers graduating per year in India, over 40% are considered unemployable by Indian industry and over 80% are unemployable in the knowledge industry. We estimate that barely 3-5% are capable of doing innovative design.

LEAP is working towards changing this, making even students from rural engineering colleges capable of innovative product design.

What Indian industry needs

Engineering Graduates who can innovate by

- **Understanding Real Life Problems** of society
- Having an **Engineering Mindset** for devising products
- Having **Systems Design** and **Engineering Skills**
- Being **Delivery Oriented** within cost and time constraints
- Having **Multi-disciplinary** collaborative **Team Skills**



LEAP IIT-Style Project Based Learning for Engineering Colleges

Project Based Learning (PBL) has been a catalyst in Revolutionizing Engineering Education across the world, including successful programs at Massachusetts USA, MIT USA, IIT Madras and IIT Mandi.

LEAP provides Industry-oriented Project Based Learning to Engineering Colleges by focused programs from 1st to 4th Year BE/BTech. All LEAP activities involve building products and learning by doing.

College faculty are trained in the LEAP pedagogy. They guide students in LEAP projects in their colleges. Students work in multi-disciplinary teams to solve real problems of society and deliver working prototypes within given time and cost constraints.

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LEAP Curriculum

Year 1: LPB01 Bootcamp | Reverse Engineering

1st year BE / B Tech students learn Product Design by **Reverse Engineering** existing products such as a table fan. This fosters design thinking and critical thinking skills. 2-3 days.

Year 1: LPB02 Bootcamp | Arduino embedded systems

1st year BE / B Tech students are introduced to **embedded systems programming** using **Arduino**. They learn about **automation with Arduino** in various domains including home automation, healthcare, agriculture and more. 2-3 days.

Year 1: LP1XX | Build a Better Product

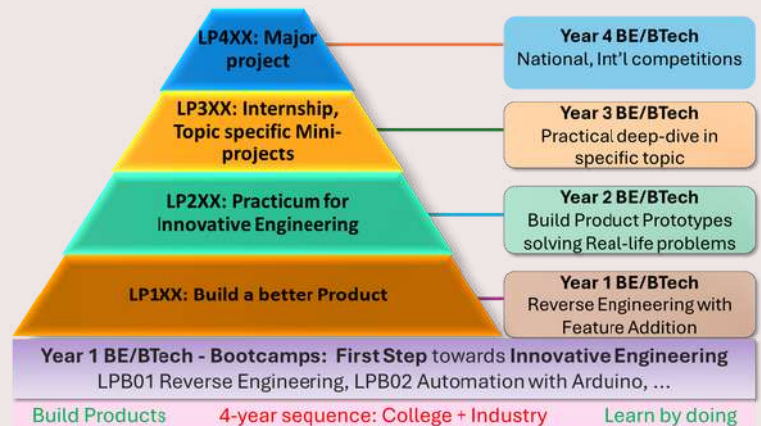
1st BE/BTech students learn **Product Design** by **Reverse Engineering** existing products such as a table fan. They then **Enhance the product** with some novel features such as remote control. 2-3 months.

Year 2: LP2XX | Practicum on Innovative Engineering

2nd BE/BTech students learn **Product Engineering** by building **Prototypes** solving **Real-world problems** in different domains including Precision Agriculture, Health Care, Home and Office automation, Aerospace, and more. 2-3 months.

Year 3-4: LP3XX | Domain-specific Mini-projects

3rd - 4th BE/BTech students **Deep-dive** in a specific **Topic** by working on a **Mini-Project** based on Real-world problems, e.g. object detection using image processing, computer vision and machine learning techniques. Good-performing LEAP students will be recommended for **Industry Internships**. 2-3 months.



Year 4: LP4XX | Major technical project

4th BE/BTech students work on 1-2 semester **Projects** to develop an innovative product. May be submitted to **National and International Competitions**, may lead to a **startup**.

Program Information

- Team Structure:
 - 4-6 students/team
 - 3 or more disciplines
 - mixed gender
- Hours per week:
 - 6-8 hrs/week for students
 - 2-3 hrs/week for Faculty
- Institute Support:
 - Faculty nomination for each project
 - Lab and workshop access

LP201 Sample Projects

Domains include:

- Agriculture tech, Urban infrastructure, Home/Office automation, Personal devices, Personal health tech, Electrical vehicles, Aerospace and many more

Sample Projects:

- Air-cooled bike helmet, Vehicle accident alert, Automated headlight dimmer, Medicine reminder, Smart hand-washing dispenser, Fire surveillance robot, Automatic CO gas detector for car cabinet and opening windows, Fluorotronix-based plantation and many more



Robotic Feeder

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Air-cooled bike
helmet



Accident
detector

LEAP BENEFITS

For Students

Acquire **Industry-specific skills** and **Domain Expertise**

Internships/Placements in Core-engineering Companies

Innovative and **Entrepreneurial** mindset

Certificate from IITM IC with performance based **Grades**, and possible Incubation **Funding**

Compete for **Regional, National** and **International Awards**

For Institutes

Evolving Project Based Learning methods in the Institute

Faculty Skill Development - Product Engineering via Practical Exposure

Industry Connect for Faculty and Institute

Upward trends in Institute Ratings via participation in competitions, enhanced placement prospects of students and incubation of project ideas as startups

Program Delivery

LEAP trains and empowers the college faculty who in turn mentor teams of students

- **Faculty Training Workshop** at the start of a program
- **Student sessions** with LEAP experts on need basis
- **Regular connect** with faculty on progress and challenges
- **Open House** for students to present their projects



MoU and Commercials

MoU and Commercials with LEAP - IITM Incubation Cell

Commercials:

- LEAP membership fee*
- LEAP Program specific fee*
- Material cost based on the projects
- Actuals for visits by LEAP experts

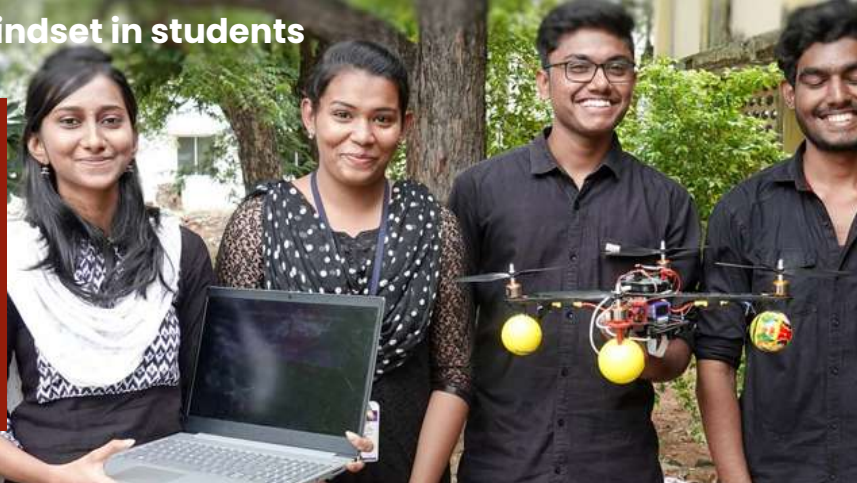
* Contact LEAP for Pricing



Agile robot

2023

1500+ Students
160+ Faculty
60+ Projects



2024

11,500+ Students
600+ Faculty
550+ Projects

LEAP Team

- Led by: Prof Timothy A Gonsalves, Founding Director, IIT Mandi (2010-2020)
- Core team: IIT Faculty and Alumni, Entrepreneurs and Industry Veterans
- Mentors: From IITs, Industry, etc.

LEAP Founding Partner



Maker Bhavan Foundation (MBF), USA is the Founding Partner for LEAP Program.

MBF is the strategic partner for LEAP. It is a Charitable Foundation enabling Science Technology Engineering and Math (STEM) education and research, with a mission to unlock the transformative potential of engineering education in jumpstarting innovation in India.

LEAP Industry Associates

LEAP is partnering with Companies / Industries across different domains.

LEAP Industry Associates collaborate on various aspects related to LEAP, e.g. Internships, Placements, Domain Specific Projects. LEAP volunteer support for different roles including Advisors, Judges and more. Industry associates can also support LEAP programs for rural and semi-urban college students via CSR funding.



LEAP Knowledge Partners



LEAP Academic Partners

